



**Australian Government**

**Department of Agriculture, Fisheries and Forestry**

# **Import risk analysis report for horses from approved countries**

**Final policy review**



**August 2013**

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### Cataloguing data

Department of Agriculture, Fisheries and Forestry (2013), *Import risk analysis report for horses from approved countries: final policy review*, Department of Agriculture, Fisheries and Forestry, Canberra

### Internet

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Front cover image provided by Lee Philip.

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## Acronyms and abbreviations

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|            |                                                                                     |
|------------|-------------------------------------------------------------------------------------|
| AHS        | African horse sickness                                                              |
| ALOP       | appropriate level of protection                                                     |
| cELISA     | competitive ELISA                                                                   |
| CEM        | contagious equine metritis                                                          |
| Code       | OIE <i>Terrestrial Animal Health Code</i>                                           |
| DAFF       | Australian Government Department of Agriculture, Fisheries and Forestry             |
| EAV        | equine arteritis virus                                                              |
| EI(V)      | equine influenza (virus)                                                            |
| ELISA      | enzyme-linked immunosorbent assay                                                   |
| EMA-1      | equi meroziote antigen 1                                                            |
| EVA        | equine viral arteritis                                                              |
| HBLB       | Horserace Betting Levy Board                                                        |
| HICC       | Horse Industry Consultative Committee                                               |
| horse IRA  | <i>Import risk analysis report for horses from approved countries: final report</i> |
| iELISA     | indirect ELISA                                                                      |
| IFAT       | indirect fluorescent antibody test                                                  |
| OIE        | World Organisation for Animal Health                                                |
| OIE Manual | <i>OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals</i>          |
| PCR        | polymerase chain reaction                                                           |
| RLB-PCR    | reverse line blot PCR                                                               |
| RT-PCR     | reverse-transcriptase PCR                                                           |
| SOPs       | standard operating procedures                                                       |
| SRH        | single radial haemolysis                                                            |
| VNT        | virus neutralisation test                                                           |

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This policy review by the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) of the *Import risk analysis report for horses from approved countries: final report* (horse IRA), released in March 2010, considers the biosecurity risks for Australia associated with the importation of horses from approved countries. This policy review also applies to donkeys and mules from approved countries. 'Horse' refers to horses, donkeys and mules unless otherwise specified.

In September 2007, the Australian Government commissioned an inquiry into the circumstances that contributed to the 2007 outbreak of equine influenza and the need for strengthened biosecurity procedures for quarantine management of imported horses. The Australian Government accepted all 38 recommendations of the inquiry. The horse IRA, completed in response to recommendation 34, assessed the risks of introduction and spread of potential disease agents associated with the importation of horses from approved countries and recommended appropriate risk management measures.

Recommendation 35 of the inquiry's report recommended periodic review of the horse IRA, taking into account relevant developments in scientific knowledge including testing methods, vaccines, vaccination procedures and biosecurity controls for horses imported into Australia. This policy review was undertaken by DAFF in response to recommendation 35. It reviews the hazard list and updates assessment and management of the risks of introduction and spread of potential disease agents associated with the importation of horses from approved countries. In future, DAFF will adopt a progressive review process to take account of scientific developments as they occur to ensure that Australia's biosecurity measures for the importation of horses remain appropriate.

Biosecurity Australia Advice 2011/18 (31 October 2011) informed stakeholders of the commencement of this review and invited submissions from interested parties. Biosecurity Advice 2013/2 (22 January 2013) invited stakeholders to comment on the draft policy review during a 60-day consultation period.

DAFF completed this policy review after considering all stakeholder comments. This policy review also takes into account stakeholder submissions received following the announcement of the review, new and relevant peer-reviewed scientific information, advice from international scientific experts, and relevant changes in industry practices and operational practicalities.

Countries, administrative regions and territories from which Australia currently permits the importation of horses are referred to in this policy review as approved countries. These comprise Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, Luxembourg, Macau, New Zealand, the Netherlands, Portugal, Singapore, Spain, Sweden, Switzerland, the United Arab Emirates, the United Kingdom and the United States.

This policy review recommends biosecurity measures for the importation of horses from approved countries. It concludes that biosecurity measures should remain unchanged from the horse IRA for the following diseases:

- African horse sickness
- anthrax

- Borna disease
- dourine
- Eastern equine encephalomyelitis
- epizootic lymphangitis
- equid herpesvirus-1 (abortigenic and neurological strains)
- equine infectious anaemia
- glanders
- Japanese encephalitis
- Lyme disease
- New World screw-worm-fly
- Old World screw-worm-fly
- rabies
- surra
- Venezuelan equine encephalomyelitis
- vesicular stomatitis.
- Western equine encephalomyelitis.

Changes to the distribution or epidemiology of African horse sickness, dourine and glanders are described in Appendix A. Current biosecurity measures continue to manage these risks.

The biosecurity measures recommended in this policy review differ from current measures for several diseases, including:

- revision of biosecurity measures for contagious equine metritis considering changes in the clinical presentation of infection with *Taylorella equigenitalis*
- revision of biosecurity measures for equine influenza considering availability of up-to-date vaccines, recent experience in molecular diagnostic techniques and reports from surveillance activities overseas, including the same minimum duration of post-arrival quarantine for all horses
- revision of biosecurity measures for equine viral arteritis considering recommendations in the World Organisation for Animal Health (OIE) Terrestrial Animal Health Code (the Code)
- revision of biosecurity measures for equine piroplasmosis considering reported changes in prevalence in some approved countries, the potential effects of regional strain differences in laboratory diagnosis and the difficulties in diagnosing and establishing the true status of subclinically infected carrier animals, especially in areas of low disease prevalence
- removal of biosecurity measures for horse pox as there are no recent reports of this infection worldwide and recommendations are no longer included in the Code
- removal of biosecurity measures for West Nile fever in line with the Code recommendation that OIE Members should not impose trade restrictions on dead-end hosts such as horses.

DAFF made a number of changes to the draft policy review following consideration of stakeholder comments. These changes include:

- clarifying the clause referring to equine influenza vaccination
- clarifying testing and vaccination requirements for equine viral arteritis
- reinstating the inadvertently omitted requirement for laboratory reports and any other supporting documents to be attached to the veterinary certificate
- adding an appendix to the biosecurity measures for horses that have been in more than one approved country during the 60 days before export
- making editorial corrections and amendments for clarification, and including additional supporting scientific information.

This policy review summarises the biosecurity measures and provides an example of an approved country, 'Country X', which includes all of the changes in a single document. Sampling, testing and treatment times are optimised wherever possible to account for animal welfare and management considerations.

# 1 Introduction

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## 1.1 Objectives

In conducting this policy review, the objective was to undertake a consultative process that engaged internal and external stakeholders and to comprehensively evaluate Australia's existing horse import conditions. This policy review also applies to the importation of donkeys and mules. 'Horse' refers to horses, donkeys and mules unless otherwise specified.

The current scientific knowledge and risk-based approach to biosecurity adopted by the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) was taken into account. Import conditions that are operationally practical were developed to efficiently and effectively facilitate the importation of live horses, while achieving Australia's appropriate level of protection (ALOP) of our animal health status.

## 1.2 Background

In September 2007, the Australian Government commissioned an inquiry into the circumstances that contributed to the 2007 outbreak of equine influenza and the need for strengthened biosecurity procedures for quarantine management of imported horses. On 12 June 2008, the Australian Government announced that it had accepted all 38 recommendations of the *Report of the equine influenza inquiry* (Callinan 2008). The *Import risk analysis report for horses from approved countries: final report* (horse IRA), released in March 2010, was completed in response to recommendation 34. The horse IRA assessed the risks of introduction and spread of potential disease agents associated with the importation of horses from approved countries and recommended appropriate risk management measures.

The horse IRA provided generic biosecurity measures from which updated import conditions were developed, in consultation with trading partners.

This policy review was conducted as a part of the government response to the recommendations of the inquiry into the outbreak of equine influenza in 2007. Recommendation 35 of the *Report of the equine influenza inquiry* states:

'That Biosecurity Australia review that formal import risk analysis at least once every two years to take into account any relevant developments in scientific knowledge—specifically testing methods, vaccines, vaccination procedures and other matters that affect biosecurity. Reports on the reviews should be provided to the officer responsible for the importation of horses and should contain recommendations for any necessary changes to policies for importation.'

This policy review, when announced on 31 October 2011 (Biosecurity Australia Advice 2011/18), was open for submissions for a period of 60 days, during which nine submissions were received.

On 22 January 2013, Biosecurity Advice 2013/2 invited stakeholders to comment on the draft policy review during a 60-day consultation period, which closed on 25 March 2013. DAFF completed this policy review after considering comments received from stakeholders.

In future, DAFF will adopt a progressive review process to take account of scientific developments as they occur to ensure that Australia's biosecurity measures for the importation of horses remain appropriate.

## **1.3 Australia's biosecurity policy**

Australia's biosecurity policies aim to protect Australia against risks that may arise from exotic diseases and pests entering, establishing and/or spreading in Australia, thereby threatening Australia's unique flora and fauna, as well as agricultural industries that are relatively free from serious diseases and pests.

DAFF is responsible for developing and reviewing biosecurity policy for the importation of animals and their products. This is done through a science-based risk evaluation process. At the completion of the process and following consideration of stakeholder comments, DAFF is responsible for implementing the import protocol, including any biosecurity measures.

DAFF's science-based risk evaluation process is consistent with Australian Government policy, and Australia's rights and obligations under the World Trade Organization's Agreement on the Application of Sanitary and Phytosanitary Measures.

Australia implements a risk-based approach to biosecurity management. This approach is expressed in terms of Australia's ALOP, which reflects community expectations through government policy and aims to reduce risks to a very low level, but not to zero.

If the level of risk associated with an importation is deemed to exceed Australia's ALOP, biosecurity measures are recommended to reduce the risk to an acceptable level. However, if it is not possible to reduce the level of risk to an acceptable level, then importation will not be allowed.

DAFF recognises that there might be new scientific information and technologies, or other combinations of measures that may provide an equivalent level of biosecurity protection for the diseases identified as requiring risk management. Submissions supporting equivalence measures will be considered on a case-by-case basis.

## **1.4 Scope**

The scope of this policy review is limited to the horse IRA and associated import conditions. It considers the biosecurity risks posed by the importation of horses into Australia from approved countries. It takes into account relevant changes in scientific knowledge, industry practices and operational practicalities.

It does not consider potential additions to the list of approved countries or transit/transshipment ports. It does not consider potential changes to Australia's overall biosecurity policy or ALOP.

In 2011, the Horse Industry Consultative Committee (HICC) agreed to discontinue the use of biosecurity measures for the temporary importation of horses. This policy review is based on this position. Revision of this decision is outside the scope of this policy review and should be raised through HICC.

## 1.5 Approved countries

DAFF has a system of approving countries for the export of horses to Australia. Countries, administrative regions and territories from which Australia currently permits the importation of horses, are referred to in the horse IRA as 'approved countries'. These comprise:

- Europe: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland (Republic of), Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, Switzerland and the United Kingdom
- North America: Canada, and the United States
- Asia: Hong Kong (Special Administrative Region), Japan, Macau (Special Administrative Region) and Singapore
- Middle East: United Arab Emirates
- Pacific Region: New Zealand.

Since the release of the horse IRA, some approved countries have not provided Veterinary Certificates for review by DAFF, and importation of horses has not occurred from these countries.

DAFF may periodically conduct a review of an approved country. This may include an assessment of the Competent or Veterinary Authority's inspection and certification systems for horses (including the pre-export quarantine facilities if necessary) and an in-country verification visit. This approach may replace the current system that is primarily focused towards auditing individual pre-export quarantine facilities in approved countries.

As detailed in Animal Quarantine Policy Memorandum 1999/62 Australia takes into account a number of criteria when considering the approval of countries to export animals and their products to Australia, including:

- the animal health status of the country
- the effectiveness of veterinary services and other relevant certifying authorities
- legislative controls over animal health, including quarantine policies and practices
- the standard of reporting to the OIE of major contagious disease outbreaks
- effectiveness of veterinary laboratory services, including compliance with relevant international standards
- effectiveness of systems for control over certification/documentation of products intended for export to Australia.

DAFF also takes into account international standards and guidelines that relate to these criteria. DAFF will consider these criteria in its assessment of the Veterinary Authority to be eligible as an 'approved country' for the export of horses to Australia. If other countries wish to be added to the list of approved countries, a successful detailed assessment as described above would need to be conducted before trade could commence.

## 1.6 Current import conditions

Horses can only be imported into Australia from approved countries after meeting the import conditions relevant to that country. Details of Australia's import conditions for horses are available from the import conditions database on the DAFF website at [http://apps.daff.gov.au/icon32/asp/ex\\_querycontent.asp](http://apps.daff.gov.au/icon32/asp/ex_querycontent.asp) (enter 'live horse' in the commodity box).

The *Quarantine Act 1908* and its subordinate legislation provide the legal basis under which biosecurity requirements for the importation into Australia of live animals, and products derived from animals, are regulated. DAFF implements and administers these requirements.

## 1.7 Potentially affected Australian sectors

For details of the structure of the horse industry in Australia, see the horse IRA (Biosecurity Australia 2010); it remains comparable at the time of publication of this policy review. Horses in Australia are used for racing, breeding, sporting activities, recreation, regulatory purposes (police horses), tourism, stock work and meat production (pet food and meat exported for human consumption).

To ensure operational considerations were taken into account, there was close consultation with DAFF representatives directly responsible for overseeing the importation of horses. Input was actively sought from relevant industry stakeholders. During the review process, communication was maintained with most industry stakeholders through the HICC process. Specific advice was received from international experts on a range of technical issues regarding the diseases under consideration. During the review, further targeted consultation with key stakeholders was undertaken in relation to biosecurity measures for contagious equine metritis and equine viral arteritis. Where specific opinions were received, these were considered in the review.

The current risk management measures were reviewed in the context of new scientific information, including expert advice where available, as well as operational feasibility and practicality. For example, the adoption of advanced technologies for disease detection and management (e.g. improvements in diagnostic techniques) for certain hazards was considered appropriate for implementation not purely on the basis of technical efficacy, but also because such measures would be least trade restrictive.

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## References

Biosecurity Australia (2010) *Import risk analysis report for horses from approved countries: final report*. Biosecurity Australia, Canberra.

Callinan I (2008) *Equine influenza: the August 2007 outbreak in Australia. Report of the Equine Influenza Inquiry* Commonwealth of Australia, Canberra.

### 2.1 Background

The World Organisation for Animal Health (OIE), in its *Terrestrial Animal Health Code* (the Code; OIE 2012), describes ‘General obligations related to certification’ in Chapter 5.1.

The Code states in Article 5.1.2. that:

The import requirements included in the international veterinary certificate should assure that commodities introduced into the importing country comply with the OIE standards. Importing countries should restrict their requirements to those necessary to achieve the national appropriate level of protection (ALOP). If these are stricter than the OIE standards, they should be based on an import risk analysis.

Article 5.1.2. further states that:

The international veterinary certificate should not include measures against pathogens or diseases which are not OIE listed, unless the importing country has demonstrated through import risk analysis, carried out in accordance with Section 2, that the pathogen or disease poses a significant risk to the importing country.

This policy review of the *Import risk analysis report for horses from approved countries: final report* (horse IRA) was conducted according to the recommendations and principles outlined in Chapter 2.1 of the Code, for undertaking risk analysis.

The components of risk analysis as described in Chapter 2.1. of the Code are:

- hazard identification
- risk assessment (entry assessment, exposure assessment, consequence assessment and risk estimation)
- risk management
- risk communication.

Hazard identification, risk assessment and risk management are sequential steps within a risk analysis. Risk communication is conducted as an ongoing process, and includes both formal and informal consultation with stakeholders.

In reviewing Australia’s current biosecurity measures, consideration was given to the recommendations of the *Report of the Equine Influenza Inquiry* (Callinan 2008), international standards developed by the OIE and import policies adopted by other countries, as well as Australian experience in the importation of horses. Where appropriate, scientific opinion was sought from independent international experts.

Consequently, in line with the conclusions of this policy review, biosecurity measures were recommended that achieve Australia’s appropriate level of protection (ALOP) for the safe importation of horses into Australia. This policy review also applies to donkeys and mules. ‘Horse’ refers to horses, donkeys and mules unless otherwise specified.

## 2.2 Risk review

Although not defined or described in the Code, risk review is recognised by risk analysts as an essential component of the risk analysis process (Barry 2007; Brett et al. 1989; FSA 2006).

Australia applies a process of risk review to the biosecurity risks associated with the importation of an animal commodity (animal product or live animal) for which current biosecurity measures exist.

Risk review differs from the monitoring and review component of risk management, as described in the Code, in that each component of the risk analysis process (hazard identification, risk assessment and risk management) is reviewed under the risk review process. If a change (either an increase or a decrease) in the biosecurity risk associated with a live animal or animal product that is currently imported into Australia is identified based on updated scientific information, risk management measures can be revised accordingly.

This policy review has drawn on the following sources of information (this list is not exhaustive):

- the Code (OIE 2012)
- horse IRA (Biosecurity Australia 2010)
- current requirements for importation of horses into Australia from approved countries
- a review of relevant scientific literature
- expert opinion.

Risk, defined by the Code as ‘the likelihood of the occurrence and the likely magnitude of the biological and economic consequences of an adverse event or effect to animal or human health’ (OIE 2012), is dynamic in nature; it changes with time. Consequently, risk should be kept under regular review.

## 2.3 Review of hazard identification

Hazard identification is described in the Code (Article 2.1.2) as a classification step that is undertaken to identify potential hazards that may be associated with the importation of a commodity (OIE 2012).

To determine whether any hazards identified in the horse IRA could be removed from the hazard list or whether any new hazards should be added to the list, the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) undertook a review of relevant new information. In cases where new information was available that might support the addition or deletion of hazards from the list, the review followed the process outlined in Article 2.1.2 of the Code to determine the relevance of the hazard.

In accordance with the Code, a disease agent was considered to be a potential hazard relevant to the importation of horses if it was assessed to be:

- appropriate to the species being imported
- OIE-listed, emerging and/or capable of producing adverse consequences in

Australia.

A hazard was retained for further review (hazard refinement) if:

- it was not present in Australia, or present in Australia and a notifiable disease or subject to official control or eradication
- it was present in the country of export (approved countries).

The steps involved in hazard identification and refinement are shown in Figure 2.1.

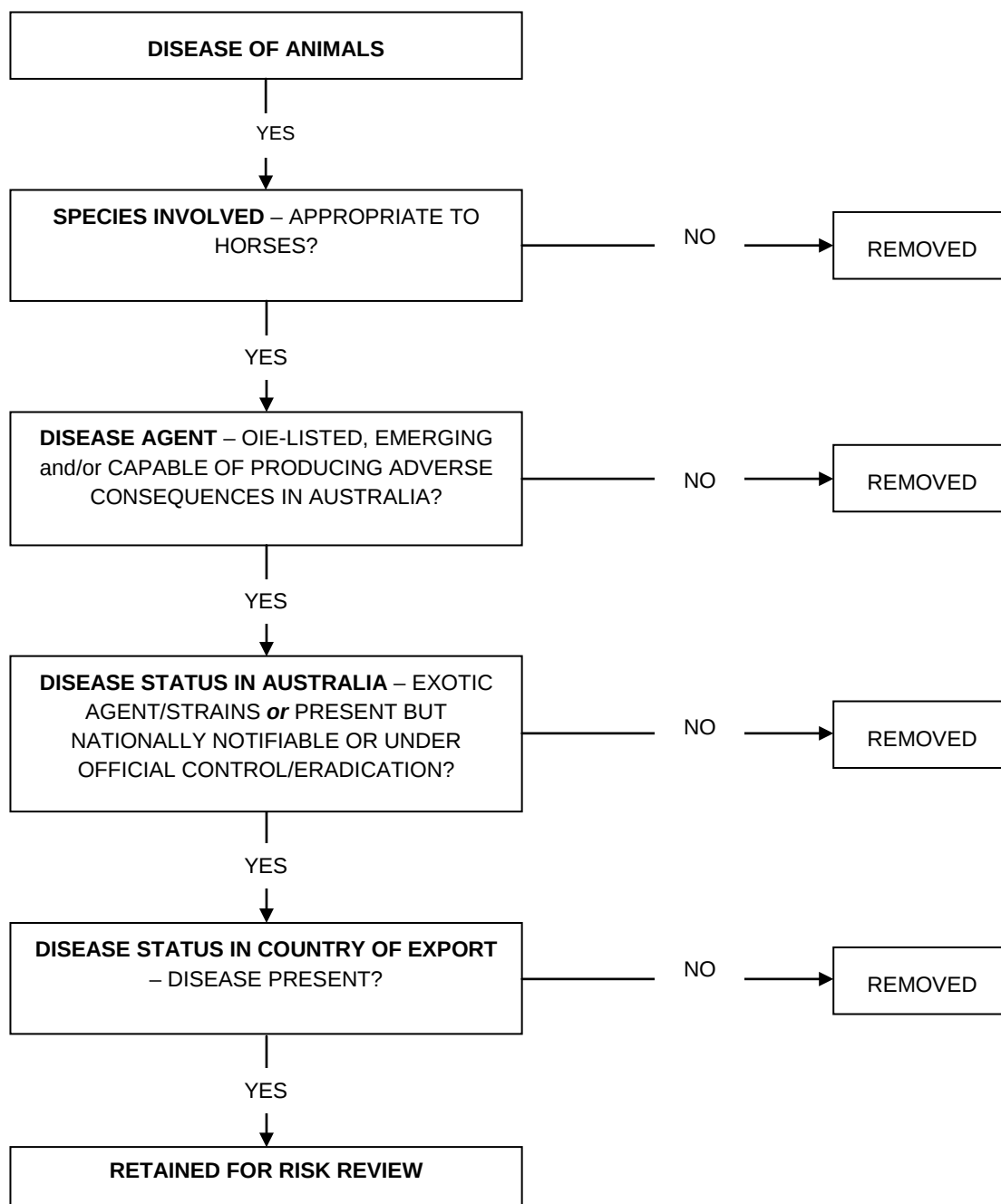


Figure 2.1. Decision tree for hazard identification and refinement

OIE-listed diseases not present in the country of export that were retained in the horse IRA were subject to further review.

## 2.4 Review of risk assessment

Details of the risk assessment process relevant to live animals are provided in Chapter 2.1 of the Code (OIE 2012).

For each hazard retained for further assessment, a review of the scientific literature (new information, published after release of the horse IRA) was performed to identify any evidence of a significant change in the risk factors relevant to the release, exposure and consequence assessment of the hazard that would be relevant to biosecurity considerations for Australia. The advice of experts with specialist knowledge of disease agents was also obtained in some instances.

If definitive information on risk factors was not found through literature review or contact with relevant experts, any uncertainties were identified and documented.

Based on the information reviewed, a conclusion was reached for each hazard about whether a significant change in biosecurity risk had occurred that was relevant to the importation of horses into Australia. Assumptions and/or judgements made in drawing conclusions for each hazard retained for further review were documented in the relevant risk review section (Chapter 4 and Appendix A).

## 2.5 Review of risk management

The Code (Chapter 2.1) divides risk management into four processes (OIE 2012):

1. *Risk evaluation—the process of comparing the risk estimated in the risk assessment with the OIE Member's ALOP.*

Australia's ALOP has not changed since the publication of the horse IRA. The conclusions drawn from the risk reviews conducted for each hazard were used as the basis for risk evaluation during this policy review. A judgement was then made to determine whether risk management was warranted to achieve Australia's ALOP.

2. *Option evaluation—the process of identifying, evaluating the efficacy and feasibility of, and selecting measures to reduce the risk associated with an importation to bring it into line with the OIE Member's ALOP. The efficacy is the degree to which an option reduces the likelihood and/or magnitude of adverse health and economic consequences. Evaluating the efficacy of the options selected is an iterative process that involves their incorporation into the risk assessment and then comparing the resulting level of risk with that considered acceptable. The evaluation for feasibility normally focuses on technical, operational and economic factors affecting the implementation of the risk management options.*

In this policy review, detailed reviews of risk management options for each hazard retained for further review were undertaken and documented (Chapter 4). When considering appropriate risk management measures, DAFF collaborated with industry stakeholders to ensure that the selected options were operationally practical and least trade restrictive.

3. *Implementation—the process of following through with the risk management decision and ensuring that the risk management measures are in place.*

For each of the hazards identified for further review, this policy review focused on determining whether risk management was warranted. Where risk management

was warranted then current biosecurity measures were reviewed. Where DAFF concluded that current biosecurity measures were no longer appropriate to achieve Australia's ALOP or were operationally impractical, alternative and/or complementary biosecurity measures were recommended.

4. *Monitoring and review—the ongoing process by which the risk management measures are continually audited to ensure that they are achieving the results intended.*

DAFF is responsible for implementing, monitoring and reviewing any applied biosecurity measures to enable the safe importation of horses.

The current biosecurity measures were reviewed in the context of updated scientific information, including expert advice where available, as well as operational practicality. Stakeholder submissions received in the consultation phase of this policy review provided guidance to identify issues of most concern relevant to the importation of horses from approved countries.

## 2.6 Risk communication

Risk communication is defined in the Code (OIE 2012) as ‘the interactive transmission and exchange of information and opinions throughout the risk analysis process concerning risk, risk-related factors and risk perceptions among risk assessors, risk managers, risk communicators, the general public and other interested parties.’

In conducting import risk analyses and policy reviews, DAFF consults with the Australian Government Department of Health and Ageing to ensure that public health considerations are included in the development of Australia's animal biosecurity policies. Furthermore, a formal process of consultation with external stakeholders is a standard procedure for all import risk analyses and policy reviews to enable stakeholder assessment and feedback on draft conclusions and recommendations about Australia's animal biosecurity policies.

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## 3 Hazard identification

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The list of diseases (hazards) of potential biosecurity concern was compiled from:

- diseases listed by the OIE as equine diseases or multiple species diseases affecting equids (OIE 2012)
- diseases identified in the *Import risk analysis report for horses from approved countries: final report* (horse IRA; Biosecurity Australia 2010)
- other diseases identified as occurring in equids.

The method of hazard identification and refinement is described in Section 2.1. The preliminary list of diseases/disease agents is shown in Table 3.1.

Table 3.1 summarises the results of the hazard refinement process, including the reason for removal or retention of each identified hazard. Additional scientific information that was required for some disease agents in order to complete the hazard refinement is summarised in Appendix A.

Many disease agents are ubiquitous or common commensals and may be present in Australia. Others (listed in the horse IRA) are opportunistic, not reported to be pathogenic, or of uncertain relevance in equids due to limited or insufficient information. These agents were considered when compiling the list of hazards of potential biosecurity concern.

Note: Equids refer to all members of the family Equidae, which includes domestic and wild species of horses, donkeys and mules, and zebras.

Table 3.1 Hazard identification and refinement

| Disease (disease agent)                                                            | Susceptible species                                         | Adverse consequences in Australia? | Present in Australia?                                 | Present in approved countries? | Potential hazard? | Retained for risk review?              |
|------------------------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------|-------------------------------------------------------|--------------------------------|-------------------|----------------------------------------|
| <b>OIE-LISTED DISEASES</b>                                                         |                                                             |                                    |                                                       |                                |                   |                                        |
| African horse sickness                                                             | Equids, rarely other species                                | Yes                                | No                                                    | No                             | No                | Yes: see Appendix A                    |
| Anthrax<br>( <i>Bacillus anthracis</i> )                                           | Mammals                                                     | Yes                                | Yes; control measures in place                        | Yes                            | Yes               | No*: no new information or submissions |
| Aujeszky's disease<br>(Suid herpesvirus 1)                                         | Pigs, ruminants, dogs, rats and occasionally horses         | Yes                                | No                                                    | Yes                            | Yes               | No*: no new information or submissions |
| Bovine tuberculosis<br>( <i>Mycobacterium bovis</i> )                              | Bovids, equids, other mammals                               | Yes                                | No                                                    | Yes                            | Yes               | No*: no new information or submissions |
| Brucellosis<br>( <i>Brucella abortus</i> )                                         | Bovids, occasionally horses                                 | Yes                                | No                                                    | Yes                            | Yes               | No*: no new information or submissions |
| Brucellosis<br>( <i>Brucella suis</i> )                                            | Pigs, rarely horses                                         | Yes                                | Yes; control measures in place                        | Yes                            | Yes               | No*: no new information or submissions |
| Contagious equine metritis<br>( <i>Taylorella equigenitalis</i> )                  | Equids                                                      | Yes                                | No                                                    | Yes                            | Yes               | Yes                                    |
| Dourine<br>( <i>Trypanosoma equiperdum</i> )                                       | Equids                                                      | Yes                                | No                                                    | Yes                            | Yes               | Yes: see Appendix A                    |
| Echinococcosis<br>( <i>Echinococcus granulosus</i> ,<br><i>E. multilocularis</i> ) | Horses (intermediate host),<br>carnivores (definitive host) | Yes                                | <i>E. granulosus</i> present;<br>other species absent | Yes                            | Yes               | No*: no new information or submissions |
| Equine infectious anaemia                                                          | Equids                                                      | Yes                                | Present in limited areas;<br>notifiable               | Yes                            | Yes               | No*: no new information or submissions |
| Equine influenza                                                                   | Equids                                                      | Yes                                | No                                                    | Yes                            | Yes               | Yes                                    |
| Equine piroplasmiasis<br>( <i>Babesia caballi</i> , <i>Theileria equi</i> )        | Equids                                                      | Yes                                | No                                                    | Yes                            | Yes               | Yes                                    |
| Equine encephalomyelitis<br>(Eastern)                                              | Birds, equids, humans, pigs,<br>other animals               | Yes                                | No                                                    | Yes                            | Yes               | No*: no new information or submissions |
| Equine encephalomyelitis<br>(Western)                                              | Birds, equids, humans, other<br>animals                     | Yes                                | No                                                    | Yes                            | Yes               | No*: no new information or submissions |
| Equine rhinopneumonitis<br>(Equid herpesvirus 1 and 4)                             | Equids                                                      | Yes                                | Strains present                                       | Yes                            | Yes               | No*: no new information or submissions |
| Equine viral arteritis                                                             | Equids                                                      | Yes                                | Strains present; notifiable                           | Yes                            | Yes               | Yes                                    |
| Glanders                                                                           | Equids, other mammals                                       | Yes                                | No                                                    | No                             | No                | Yes: see Appendix A                    |

| Disease (disease agent)                                                                                       | Susceptible species                                                 | Adverse consequences in Australia? | Present in Australia?                       | Present in approved countries? | Potential hazard? | Retained for risk review?              |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|------------------------------------|---------------------------------------------|--------------------------------|-------------------|----------------------------------------|
| <i>Burkholderia malleri</i><br>Japanese encephalitis                                                          | including humans<br>Some mammals, including equids; birds, reptiles | Yes                                | Absent from mainland Australia and Tasmania | Yes                            | Yes               | No*: no new information or submissions |
| New World screwworm<br>( <i>Cochliomyia hominivorax</i> )                                                     | Mammals                                                             | Yes                                | No                                          | No                             | No                | No*: no new information or submissions |
| Nipah virus                                                                                                   | Bats, pigs, cats, dogs, horses, humans                              | Yes                                | No                                          | No                             | No                | No*: no new information or submissions |
| Old World screwworm<br>( <i>Chrysomya bezziana</i> )                                                          | Mammals                                                             | Yes                                | No                                          | Yes                            | Yes               | No*: no new information or submissions |
| Q fever<br>( <i>Coxiella burnetii</i> )                                                                       | Multiple species                                                    | Yes                                | Yes                                         | Yes                            | No                | No*: no new information or submissions |
| Rabies                                                                                                        | Mammals                                                             | Yes                                | No                                          | Yes                            | Yes               | No*: no new information or submissions |
| Rift Valley fever                                                                                             | Ruminants, horses, pigs, wildlife, humans                           | Yes                                | No                                          | No                             | No                | No*: no new information or submissions |
| Surra<br>( <i>Trypanosoma evansi</i> )                                                                        | Some mammals                                                        | Yes                                | No                                          | Yes                            | Yes               | No*: no new information or submissions |
| Trichinellosis<br>( <i>Trichinella spiralis</i> )                                                             | Mammals, esp. carnivores                                            | Yes                                | No                                          | Yes                            | Yes               | No*: no new information or submissions |
| Trypanosomosis (tsetse-transmitted)<br>( <i>Trypanosoma brucei</i> , <i>T. congolense</i> , <i>T. vivax</i> ) | Bovids, other livestock, equids, humans                             | Yes                                | No                                          | No                             | No                | No*: no new information or submissions |
| Venezuelan equine encephalomyelitis                                                                           | Birds, equids, humans, other animals                                | Yes                                | No                                          | No                             | No                | No*: no new information or submissions |
| Vesicular stomatitis                                                                                          | Equids, bovids, pigs, humans                                        | Yes                                | No                                          | Yes                            | Yes               | No*: no new information or submissions |
| West Nile fever                                                                                               | Birds, equids, humans, other animals                                | Yes                                | Yes                                         | Yes                            | Yes               | Yes: see Appendix A.                   |

| Disease (disease agent)                                     | Susceptible species                                     | Adverse consequences in Australia? | Present in Australia? | Present in approved countries? | Potential hazard? | Retained for review?                                |
|-------------------------------------------------------------|---------------------------------------------------------|------------------------------------|-----------------------|--------------------------------|-------------------|-----------------------------------------------------|
| <b>DISEASES NOT LISTED BY OIE</b>                           |                                                         |                                    |                       |                                |                   |                                                     |
| <b>Viruses</b>                                              |                                                         |                                    |                       |                                |                   |                                                     |
| Borna disease                                               | Horses, cats, cattle, sheep, rabbits, ostriches, humans | Yes                                | No                    | Yes                            | Yes               | No <sup>2</sup> : no new information or submissions |
| Equid herpesvirus 2, 3, 5-9                                 | Equids                                                  | Yes                                | Some viruses present  | Yes                            | Yes               | No <sup>2</sup> : no new information or submissions |
| Equine adenovirus 1 and 2                                   | Horses                                                  | Yes                                | Yes                   | Yes                            | No                | No <sup>2</sup> : no new information or submissions |
| Equine coronavirus                                          | Horses                                                  | Yes                                | Yes                   | Yes                            | No                | No <sup>2</sup> : no new information or submissions |
| Equine encephalosis                                         | Equids                                                  | Yes                                | No                    | No                             | No                | No <sup>2</sup> : no new information or submissions |
| Equine enterovirus                                          | Horses                                                  | No <sup>1</sup>                    | Not reported          | Yes                            | No                | No <sup>2</sup> : no new information or submissions |
| Equine parainfluenza virus                                  | Horses                                                  | No                                 | No                    | No                             | No                | No <sup>2</sup> : no new information or submissions |
| Equine rhinitis A virus (formerly equine rhinovirus 1)      | Horses, camels                                          | Yes                                | Yes                   | Yes                            | No                | No <sup>2</sup> : no new information or submissions |
| Equine rhinitis B virus (formerly equine rhinovirus 2 or 3) | Horses                                                  | Yes                                | Yes                   | Yes                            | No                | No <sup>2</sup> : no new information or submissions |
| Equine torovirus (Berne virus)                              | Horses                                                  | No                                 | Not reported          | Yes                            | No                | No <sup>2</sup> : no new information or submissions |
| Getah virus                                                 | Horses, pigs                                            | Yes                                | No                    | Yes                            | No                | No <sup>2</sup> : no new information or submissions |
| Hendra virus                                                | Bats, horses, humans                                    | Yes                                | Yes                   | No                             | No                | No <sup>2</sup> : no new information or submissions |
| Horse pox                                                   | Equids                                                  | Yes                                | No                    | No                             | No <sup>2</sup>   | No. Requirement removed from biosecurity measures   |
| Louping ill virus                                           | Sheep, horses, other mammals                            | Yes                                | No                    | Yes                            | Yes               | No <sup>2</sup> : no new information or submissions |
| Shuni virus                                                 | Horses, cattle, goats, sheep, humans                    | Yes                                | No                    | No                             | No <sup>3</sup>   | No: not present in approved countries               |

<sup>1</sup> Single isolation from oral cavity of clinically healthy horse in 1983 (Studdert, 1996).

<sup>2</sup> Historical references to horse pox exist but there are no recent reports of this infection worldwide; not OIE-listed; no longer recommendations in the Code.

<sup>3</sup> Shuni virus, an orthobunyavirus first reported in Africa in the 1960s, was noted in South Africa as a cause of neurological disease in horses (van Eeden et al. 2012).

| Disease (disease agent)                                                  | Susceptible species                 | Adverse consequences in Australia? | Present in Australia?     | Present in approved countries? | Potential hazard? | Retained for review?                                                                                                                                           |
|--------------------------------------------------------------------------|-------------------------------------|------------------------------------|---------------------------|--------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Bacteria</b>                                                          |                                     |                                    |                           |                                |                   |                                                                                                                                                                |
| Equine paratyphoid<br>( <i>Salmonella Abortusequi</i> )                  | Equids                              | Yes                                | No                        | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions                                                                                                            |
| Leptospirosis<br>( <i>Leptospira</i> spp.)                               | Vertebrates                         | Yes                                | Multiple serovars present | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions<br>No longer OIE-listed                                                                                    |
| Lyme disease<br>( <i>Borrelia burgdorferi</i> )                          | Humans, wild animals, other mammals | Yes (human)                        | Not isolated              | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions                                                                                                            |
| Melioidosis<br>( <i>Burkholderia pseudomallei</i> )                      | Mammals                             | Yes                                | Yes                       | Yes                            | No                | No <sup>#</sup> : no new information or submissions                                                                                                            |
| Proliferative enteropathy<br>( <i>Lawsonia intracellularis</i> )         | Horses, pigs                        | Yes                                | Yes                       | Yes                            | No                | No <sup>#</sup> : no new information or submissions                                                                                                            |
| <i>Taylorella asinigenitalis</i>                                         | Equids                              | Yes                                | No                        | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions                                                                                                            |
| <b>Rickettsias</b>                                                       |                                     |                                    |                           |                                |                   |                                                                                                                                                                |
| Equine granulocytic anaplasmosis<br>( <i>Anaplasma phagocytophilum</i> ) | Horses, dogs, ruminants             | Yes                                | Not reported              | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions                                                                                                            |
| Spirochaetosis<br>( <i>Borrelia theileri</i> )                           | Cattle, horses, other ruminants     | No                                 | Yes                       | Yes                            | No                | No <sup>#</sup> : no new information or submissions                                                                                                            |
| Potomac horse fever<br>( <i>Neorickettsia risticii</i> )                 | Horses, possibly other animals      | Yes                                | No                        | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions                                                                                                            |
| <b>Fungi</b>                                                             |                                     |                                    |                           |                                |                   |                                                                                                                                                                |
| Epizootic lymphangitis<br>( <i>Histoplasma farciminosum</i> )            | Equids, other mammals               | Yes                                | No                        | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions<br>No longer recommendations in the Code but premises freedom requirement retained in biosecurity measures |
| <b>Protozoa</b>                                                          |                                     |                                    |                           |                                |                   |                                                                                                                                                                |
| Besnoitiosis<br>( <i>Besnoitia bennetti</i> )                            | Equids                              | Yes                                | No                        | Yes                            | No                | No <sup>#</sup> : no new information or submissions                                                                                                            |
| Equine protozoal myeloencephalitis<br>( <i>Sarcocystis neurona</i> )     | American opossum, horses            | Yes                                | No                        | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions                                                                                                            |

| Disease (disease agent)                                      | Susceptible species                 | Adverse consequences in Australia? | Present in Australia? | Present in approved countries? | Potential hazard? | Retained for review?                   |
|--------------------------------------------------------------|-------------------------------------|------------------------------------|-----------------------|--------------------------------|-------------------|----------------------------------------|
| <b>Arthropods: Insecta</b>                                   |                                     |                                    |                       |                                |                   |                                        |
| Nasal bot<br>( <i>Rhinoestrus purpureus</i> )                | Equids                              | Yes                                | No                    | Yes                            | Yes               | No*: no new information or submissions |
| Warble fly<br>( <i>Hypoderma bovis</i> , <i>H. lineata</i> ) | Cattle, rarely equids, humans       | Yes                                | No                    | Yes                            | No                | No*: no new information or submissions |
| <b>Arthropods: Arachnida mites</b>                           |                                     |                                    |                       |                                |                   |                                        |
| Horse mange<br>( <i>Sarcoptes scabiei</i> var <i>equi</i> )  | Equids, other mammals               | Yes                                | No                    | Yes                            | Yes               | No*: no new information or submissions |
| Psoroptic mange<br>( <i>Psoroptes equi</i> )                 | Equids                              | Yes                                | No                    | Yes                            | Yes               | No*: no new information or submissions |
| <b>Arthropods: Arachnida ticks</b>                           |                                     |                                    |                       |                                |                   |                                        |
| <i>Amblyomma</i> spp., <i>Ornithodoros</i> spp.              | Mammals, reptiles, birds            | Yes                                | Some species present  | Yes                            | Yes               | No*: no new information or submissions |
| <i>Hyalomma</i> spp.                                         | Cattle, horses and other mammals    | Yes                                | No                    | Yes                            | Yes               | No*: no new information or submissions |
| <i>Ixodes</i> spp. not present in Australia                  | Humans, dogs, equids, others        | Yes                                | No                    | Yes                            | Yes               | No*: no new information or submissions |
| Ear tick<br>( <i>Otobius megnini</i> )                       | Dogs, equids, cattle, sheep, others | Yes                                | Yes                   | Yes                            | No                | No*: no new information or submissions |
| <i>Rhipicephalus</i> spp. not present in Australia           | Cattle, dogs, horses, other mammals | Yes                                | No                    | Yes<br>Some species            | Yes               | No*: no new information or submissions |

| Disease (disease agent)                                                                                                                                               | Susceptible species                   | Adverse consequences in Australia? | Present in Australia? | Present in approved countries? | Potential hazard? | Retained for review?                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------|-----------------------|--------------------------------|-------------------|-----------------------------------------------------|
| <b>Helminths: nematodes</b>                                                                                                                                           |                                       |                                    |                       |                                |                   |                                                     |
| Stomach tumour worm<br>( <i>Draschia megastoma</i> )                                                                                                                  | Equids                                | Yes                                | Yes                   | Yes                            | No                | No <sup>#</sup> : no new information or submissions |
| Arterial worm<br>( <i>Elaeophora boehmi</i> )                                                                                                                         | Horses                                | Yes                                | No                    | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions |
| Gullet worm<br>( <i>Gongylonema pulchrum</i> )                                                                                                                        | Equids                                | Yes                                | No                    | Yes                            | No                | No <sup>#</sup> : no new information or submissions |
| Bloody sweat worm<br>( <i>Parafilaria multipapillosa</i> )                                                                                                            | Equids                                | Yes                                | No                    | No                             | No                | No <sup>#</sup> : no new information or submissions |
| <i>Rhabditis gingivalis</i>                                                                                                                                           | Equids                                | Yes                                | No                    | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions |
| Peritoneal worm<br>( <i>Setaria equina</i> )                                                                                                                          | Equids                                | Yes                                | No                    | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions |
| Eye worm<br>( <i>Thelazia lacrymalis</i> )                                                                                                                            | Cattle, buffalo, camels, dogs, horses | Yes                                | No                    | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions |
| <b>Helminths: cestodes</b>                                                                                                                                            |                                       |                                    |                       |                                |                   |                                                     |
| Echinococcus<br>( <i>Echinococcus equinus</i> )                                                                                                                       | Equids                                | Yes                                | No                    | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions |
| <b>Helminths: trematodes</b>                                                                                                                                          |                                       |                                    |                       |                                |                   |                                                     |
| Giant liver fluke<br>( <i>Fasciola gigantica</i> )                                                                                                                    | Cattle, goats, sheep, horses, others  | Yes                                | No                    | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions |
| Liver fluke<br>( <i>Fasciola hepatica</i> )                                                                                                                           | Cattle, goats, sheep, horses, others  | Yes                                | Yes                   | Yes                            | No                | No <sup>#</sup> : no new information or submissions |
| Stomach fluke<br>( <i>Gastrodiscus aegyptaeicus</i> )                                                                                                                 | Equids, pigs, warthogs                | Yes                                | No                    | No                             | Yes               | No <sup>#</sup> : no new information or submissions |
| Schistosomiasis<br>( <i>Schistosoma indicum</i> ,<br><i>S. intercalatum</i> , <i>S. japonicum</i> ,<br><i>S. matthei</i> , <i>S. nasale</i> ,<br><i>S. Spindale</i> ) | Equids, ruminants, rodents            | Yes                                | No                    | Yes                            | Yes               | No <sup>#</sup> : no new information or submissions |

\* Risk management measures retained unchanged, in accordance with the horse IRA

# Risk management measures not required, in accordance with the horse IRA

## Conclusion

For the majority of hazards identified in the horse IRA, there was no new scientific information, or pre-review stakeholder submissions, that necessitated a review of disease risk or management. For those hazards, no further review was necessary.

For the following diseases there was new information or pre-review stakeholder submissions and they were retained for risk review (Chapter 4):

- contagious equine metritis (*Taylorella equigenitalis*)
- equine influenza
- equine piroplasmiasis (*Babesia caballi*, *Theileria equi*)
- equine viral arteritis.

For the following diseases there was new information about disease distribution or epidemiology but current biosecurity measures were considered to manage these risks or were no longer required (Appendix A):

- African horse sickness
- dourine
- glanders
- West Nile fever.

## References

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Biosecurity Australia (2010) *Import risk analysis report for horses from approved countries: final report*. Biosecurity Australia, Canberra.

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### 4.1 Contagious equine metritis

#### 4.1.1 Background

Contagious equine metritis (CEM) is a venereal disease of equids caused by *Taylorella equigenitalis*, characterised by a purulent vaginal discharge and temporary infertility in mares. Stallions do not show clinical signs and are inapparent carriers of the bacteria on external genitalia. The disease may become endemic and often causes subclinical infections. CEM is an OIE-listed disease (OIE 2012e).

Relevant and new information was considered in this policy review of the *Import risk analysis report for horses from approved countries: final report* (horse IRA). For further information on CEM refer to the horse IRA (Biosecurity Australia 2010).

#### 4.1.2 Technical information

##### Epidemiology

*T. equigenitalis* is a Gram-negative coccobacillus. Two main strains, based on sensitivity to streptomycin, have been isolated. Additional strains have been identified from samples from non-thoroughbred breeds using field inversion gel electrophoresis of fragments of genomic DNA. The strains found in non-thoroughbred horse breeds result in milder clinical signs of disease (Bleumink-Pluym et al. 1990).

Mares and stallions can become carriers of the organism and this is a major factor in the epidemiology of the disease. In mares, *T. equigenitalis* may persist on mucous membranes of the clitoral sinus or fossa and the uterus, including during pregnancy. Although the majority of carrier mares will have positive swabs from the external genitalia, in some mares the organism will only be detectable in the uterus (Timoney et al. 1978a). In stallions, the organism localises in the urethral fossa and sinus, the distal urethra and on the external surface of the penis and prepuce. The genitalia of newborn foals from infected dams may be colonised by *T. equigenitalis* and be a potential source of infection when the foal reaches sexual maturity (Timoney and Powell 1982).

Natural service and artificial insemination are major sources of spread of CEM. The most common sources of infection are contaminated semen, contaminated equipment or unhygienic breeding practices.

Since the horse IRA, there have been further confirmed cases and outbreaks of CEM in Ireland (OIE 2012f), Portugal (OIE 2011b), South Africa (OIE 2011d), the United Kingdom (OIE 2010c; OIE 2010d; OIE 2012g) and the United States (OIE 2010b; OIE 2011e). The majority of cases were detected through testing either for pre-breeding or export purposes and did not show evidence of clinical disease. As CEM is not notifiable in some countries and many cases have few or no clinical signs, there may be an underestimation of the distribution of the infection worldwide.

## Clinical signs

For more details of the clinical signs and incubation period, see the horse IRA (Biosecurity Australia 2010).

Clinical signs of CEM can be very mild and therefore undetected as was the case for CEM in the United States. It was probably introduced in late 2000 but was not detected until 2008 (Erdman et al. 2011; Luddy and Kutzler 2010). This is likely due to the mild nature or absence of any clinical signs in infected horses and the relative lack of testing. In Ireland a stallion imported in 2009 was found positive for CEM in 2012 despite previous negative test results (OIE 2012f).

The severity of clinical signs may relate to different strains of *T. equigenitalis* and/or breeds of horses infected (Bleumink-Pluym et al. 1990; Parlevliet et al. 1997). Severe clinical signs were described in thoroughbreds during the late 1970s (Ricketts 1996). As horses show less severe clinical signs with subsequent infections, that initial outbreak was likely in a naive population. The origin of the organism or the cause of its clinical emergence in thoroughbreds in 1977 has remained obscure. Recent infections have predominantly been in non-thoroughbreds and without clinical signs. The organisms responsible may be less virulent strains that have been considered commensal organisms by some investigators (Parlevliet et al. 1997).

## Diagnosis

### Culture

Definitive diagnosis is by isolation of *T. equigenitalis* from swabs of the genital tract. Culture should be performed by a laboratory experienced in isolating *T. equigenitalis* as the organism is fastidious and difficult to grow.

In mares, samples are collected from the clitoris, including the fossa and sinuses, and the deep cervix or endometrium. For stallions, swabs are collected from the penile sheath, urethral fossa or sinus and urethra. Sampling frequency and protocol are dependent on the risk status of the mare and stallion.

Diagnostic techniques for CEM recommended in the OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals (OIE Manual) consist of swabbing and testing protocols broadly based on those described for breeding populations in the British Horserace Betting Levy Board (HBLB) Code of Practice (HBLB 2012). The HBLB guidelines are reviewed annually. Mares defined by the HBLB as 'low risk' for CEM typically require a single clitoral swab and a single endometrial swab. Mares defined as 'high risk' for CEM require two clitoral swabs (at least seven days apart) and an endometrial swab. For mares that have been previously diagnosed with CEM, three clitoral swabs (at least seven days apart) and three endometrial swabs (from three consecutive oestrous cycles) are required to confirm disease freedom.

Stallions require two sets of swabs to be taken at an interval of at least seven days apart. Stallions previously diagnosed with CEM require three sets of swabs to be taken at intervals of at least seven days and negative results confirmed. Thereafter, the first three mares mated or inseminated by the stallion require clitoral swabs to be taken three times at intervals of at least seven days. In the 2008 outbreak in the United States, three of the infected stallions were negative on swab samples and were only found positive after test breeding (Erdman et al. 2011). Furthermore, stallions imported into the United States with negative swabs have been identified as carriers

only by test mating (Timoney 2007). This confirms that test breeding of stallions to susceptible mares is the most sensitive procedure for finding carrier stallions.

The rationale for the seven day interval between sample collections is unclear and relevant research is limited. It may have been based on the slow generation time of the organism on bacteriological media and the sparseness of growth obtained on culture from some mares and stallions. For those horses that are intermittently shedding the bacterium, spacing the sampling interval to equal to, or greater than, seven days might increase the chances of detecting it on culture. In an Australian study, two of seven mares that were experimentally infected became chronic carriers. For one of those carrier mares, five swabs collected over a two week period were negative (Rogerson et al. 1984). However, in a naturally infected carrier mare, negative cultures were obtained for just four consecutive days during an 11-day sampling period (Timoney et al. 1978b). With such limited data it is difficult to accurately define a suitable sampling interval.

### Serology

Serology is unreliable as a diagnostic tool, but it may be helpful as an adjunct screening test (OIE 2012a). Antibodies can be found in acutely infected mares from seven days after infection; however, in some mares, they may be undetectable for two to three weeks. Antibodies persist for up to 6 to 10 weeks after the primary infection (CFSPH 2009).

### Molecular techniques

Polymerase chain reaction (PCR) assays are widely used and are more sensitive and faster in confirming diagnoses of CEM than culture (Anzai et al. 2002; Bleumink-Pluym et al. 1993; Ousey et al. 2009; Wakeley et al. 2006). PCR is useful for differentiating between *T. equigenitalis* and *T. asinigenitalis* (Wakeley et al. 2006). PCR testing of swabs is now validated for industry screening purposes within the United Kingdom (HBLB 2012; Ousey et al. 2009) and is less dependent on transport times, conditions and media. It has been used to investigate disease outbreaks (Erdman et al. 2011; OIE 2011d) and to assist in eradication of the disease from Japan (Anzai et al. 2002). However, PCR assays for CEM are not recognised tests for international trade.

### Treatment

For a more details of treatment, see the horse IRA (Biosecurity Australia 2010). Despite 30 years of the routine use of topical and systemic antibiotics to treat CEM, the susceptibility of the isolate from the 2008 outbreak in the United States was relatively unchanged from that exhibited by the strains isolated in the late 1970s (Erdman et al. 2011).

### Vaccination

There are no effective vaccinations that protect against CEM infection.

## 4.1.3 Current biosecurity measures

Australia's current biosecurity measures for CEM follow the recommendations in the Code (OIE 2009a). The 2009 Code recommendations included premises freedom and diagnostic testing. They are based on the HBLB's Code of Practice (HBLB 2007).

#### 4.1.4 Risk review

CEM is present in approved countries but is not present in Australia, where it is a nationally notifiable animal disease (DAFF 2011).

Since the horse IRA, there has been little new information or research on CEM. Severe clinical signs have only been seen in the outbreaks in the late 1970s. Most cases since that time have shown no clinical signs of disease and detection has occurred only during testing of horses for breeding or export. When detected, the effects of infection on equine breeding industries have not been significant.

Some chronically infected mares may carry infection only in the uterus (Timoney et al. 1978a). Foals (male and female) can acquire infection during birth and become chronic carriers even before breeding (Timoney and Powell 1982). Since implementation of the measures based on the horse IRA, the difficulty of obtaining endometrial samples from anoestrous females (females in competition, seasonal anoestrus, juveniles and pregnant mares) has resulted in varied levels of compliance. On release from post-arrival quarantine, anoestrous females may undergo quarantine surveillance until negative endometrial swabs are obtained. In these circumstances, quarantine surveillance is difficult to support operationally and is consequently not a reliable risk management option.

The majority of recent international reports of outbreaks of infection have been in stallions detected at testing either for pre-breeding or export purposes without evidence of clinical disease.

There is good evidence that swabs of external genitalia are not sufficient to detect infection in some stallions (Timoney 2007). Test mating susceptible mares is the most reliable protocol for testing stallions for CEM, but is impractical for international trade in horses. Scientific advice commissioned by the review indicates that a sampling interval between swabs of 4–5 days is likely to be as effective as the current requirement for the sampling interval to be at least seven days apart.

PCR testing is more sensitive than culture for detecting infection. However, PCR assays for CEM are currently not recognised by the OIE for international trade in horses. The Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) will consider the use of PCR assays for diagnosis of CEM when they are validated and recognised for international trade.

Testing is not required for donkeys and mules as they are unlikely to play a significant role in the epidemiology of CEM.

#### 4.1.5 Conclusion

CEM is present in approved countries but is not present in Australia, where it is a nationally notifiable animal disease (DAFF 2011). Based on the preceding information, risk management for CEM continues to be warranted with some amendments. The combination of horse mating history, premises freedom and pre-export diagnostic testing are considered appropriate biosecurity measures.

#### Biosecurity measures for contagious equine metritis

The following biosecurity measures apply to horses (excluding donkeys and mules) and foals, unless otherwise specified.

For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of contagious equine metritis occurred during the previous two years before export.

**OR**

For all horses excluding geldings and unweaned foals under six months of age:

For 60 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of contagious equine metritis occurred in horses during the previous 60 days before export.

**AND**

The horse was never mated to, or inseminated with semen from, a horse that was, at the time of mating or semen collection, known to be infected with *Taylorella equigenitalis*.

NOTE: If a horse does not meet this requirement, or has been known to be infected with *T. equigenitalis*, it may be permitted entry subject to an approved method of treatment and testing considered appropriate by the Director of Quarantine (or delegate).

**AND**

The horse was not treated with antibiotics for at least seven days before collection of the first samples for culture nor during the sample collection period.

**AND**

The horse was not mated to or inseminated with semen from a horse after collection of the first samples for culture.

**AND**

Samples were taken from the horse during pre-export quarantine and tested for *T. equigenitalis* by culture<sup>#</sup> with negative results in each case.

For colts and stallions separate samples from each of the urethra, the urethral fossa and sinus, and the penile sheath were collected on two occasions at least four days apart.

**OR**

For fillies and mares, one sample from the clitoral fossa, including the clitoral sinuses, was collected on two occasions at least four days apart.

<sup>#</sup>The swabs were transported to a laboratory in Amies charcoal medium, kept cool and the samples were set up for culture within 48 hours of collection. The culture must be incubated for at least seven days before it can be certified negative for *T. equigenitalis*.

## 4.2 Equine influenza

### 4.2.1 Background

Equine influenza (EI) is an acute respiratory disease of equids caused by equine influenza virus (EIV). EI is an OIE-listed disease (OIE 2012e).

Relevant and new information was considered in this policy review. For further information on EI refer to the horse IRA (Biosecurity Australia 2010).

A substantial amount of information relating to the 2007 outbreak of EI in Australia is available. However, this is not necessarily relevant to the EI situation in approved countries. The vast majority of horses in Australia before the outbreak were naive to EIV, compared to populations in approved countries where horses may be routinely vaccinated or exposed to infection. Vaccination decreases the incidence and severity of clinical signs and the extent of virus shedding (OIE 2012b).

### 4.2.2 Technical information

#### Epidemiology

Paillot et al. (2013) found that naive/sentinel ponies shed EIV for an average of six days, EIV was detectable up to ten days following infection, and active transmission of disease may have occurred up to eight days after infection or co-mingling with infected ponies. Paillot et al. (2013) note that this duration of EIV shedding is longer than previous studies have found, but suggest this may be due to differences in methods of virus detection, and the nature and dose of EIV used.

EIV diverged into American and Eurasian lineages in the late 1980s, and the American lineage has further diverged into Florida sublineages clades 1 and 2. The global distribution of different sublineages may be changing. Antigenic and genetic characterisation of 28 EIV strains isolated in North America and Europe during 2006 and 2007 found that Florida sublineage clade 1 viruses appeared to predominate in North America and clade 2 viruses in Europe (Bryant et al. 2009). From 2008 to 2009, Florida sublineage viruses from both clades 1 and 2 circulated in Europe, while clade 1 viruses continued to circulate in North America (Bryant et al. 2011). Relaxation of European quarantine restrictions has been suggested as leading to the introduction of the American variant into Europe and co-circulation of the two lineages (Daly et al. 2013).

Spread of EIV is by the respiratory route, and indirectly by contaminated personnel, vehicles and fomites (OIE 2012b). Reports of the 2007 EI outbreak in Australia suggested windborne and other methods of EIV transmission in spread of the disease, but supporting evidence continues to be inconclusive (Firestone et al. 2012a; Firestone et al. 2012b; Kung et al. 2011; Major 2011; Moloney et al. 2011; Spokes et al. 2009; Wilson et al. 2011). There was scant unequivocal evidence documenting particular mechanisms of spread. Fomite transmission, a well-established method of EI spread, could not be excluded in these studies.

In 2009, avian H5N1 influenza virus was isolated from donkeys with respiratory disease in Egypt (Abdel-Moneim et al. 2010).

## Clinical signs

For a discussion of the clinical signs and incubation period, see the horse IRA (Biosecurity Australia 2010).

## Diagnosis

Diagnosis of EI is based on detecting virus or viral product, or demonstration of a serological response to infection.

For diagnosis of EI, reverse-transcriptase polymerase chain reaction (RT-PCR) assays have repeatedly been shown to be more sensitive than other methods (Bryant et al. 2010; Lu et al. 2009; Paillot et al. 2010; Read et al. 2012).

A quantitative RT-PCR assay detected viral RNA earlier (as early as one day post-challenge) and for longer than other diagnostic methods (nucleoprotein enzyme-linked immunosorbent assay and egg titration), including in the absence of clinical signs of EIV infection (Bryant et al. 2010).

Lu et al. (2009) evaluated three TaqMan real-time RT-PCR assays targeting the nucleoprotein, matrix and haemagglutinin genes of H3N8 subtype of EIV using nasal swabs received for routine diagnosis and swabs collected from experimentally inoculated horses. The real-time RT-PCR assays were found to be highly sensitive and specific compared to the Directigen<sup>TM</sup> Flu A test and virus inoculation in embryonated eggs. The authors concluded that the assays provided a fast and reliable method of virus detection and disease surveillance (Lu et al. 2009).

Directigen<sup>TM</sup> EZ Flu A+B kit showed only moderate sensitivity (but high specificity) for diagnosis of EIV compared to the EIV quantitative real-time RT-PCR assay and enzyme-linked immunosorbent assay (ELISA) methods (Paillot et al. 2013).

During the Australian EI outbreak in 2007, Read et al. (2012) used a pan-reactive influenza type A real-time RT-PCR assay targeting the matrix gene. It had not previously been used to detect EIV infection in horses but had been used for testing avian samples. Testing of nasal swabs from horses that were immunologically naive before exposure showed that this assay had high sensitivity and specificity. It was able to detect virus from the first sign of clinical disease and could detect viral RNA up to 34 days later and infection was often detected before the onset of clinical signs. Most of the product detected by the real-time RT-PCR assays late in the course of infection was believed to be non-infectious material (Read et al. 2012). Although the real-time RT-PCR assay specific for equine strains of the H3 subtype of influenza may have comparable or slightly higher sensitivity, Read et al. (2012) recommend the use of the pan-reactive real time RT-PCR assay for primary screening because it can detect any strain of influenza virus and would be less likely to miss a variant strain if one arose.

Pyrexia is typically the first sign of EI infection, peaking from 48 to 96 hours after infection (Landolt et al. 2007). Monitoring of rectal temperatures is useful in early detection of EI, including in vaccinated horses. New technologies for recording body temperatures of horses are under development but the sensitivity of such methods is low. In a study comparing temperature readings from an implantable percutaneous thermal sensing microchip with a digital rectal thermometer, the sensitivity of the thermal sensor for detection of pyrexia differed significantly in warmer ambient temperatures compared with colder ambient temperatures (Robinson et al. 2008).

## Vaccination

In 2010, 2011 and 2012, the OIE Expert Surveillance Panel on Equine Influenza Vaccine Composition recommended that updated vaccines for the international market should contain both clade 1 and clade 2 viruses of the Florida sublineage—clade 1 represented by South Africa/03-like or Ohio/03-like viruses; clade 2 represented by Richmond/1/07-like viruses (OIE 2010a; OIE 2011a; OIE 2012d). Inclusion of an H7N7 virus or an H3N8 virus of the Eurasian lineage is no longer considered necessary (OIE 2011a; OIE 2012d).

The importance of using vaccines with updated virus strains continues to be noted (Baguelin et al. 2010; Bryant et al. 2010; Cullinane et al. 2010; Elton and Bryant 2011; OIE 2012d; Paillot et al. 2010; Paillot et al. 2013). However, a major time lag exists between the OIE recommending strains and vaccines containing such strains becoming commercially available.

Gildea et al. (2011) studied the antibody response, of National Hunt horses in training, to booster vaccination using the six EI vaccines available in Ireland (none contained OIE recommended strains of virus). Antibodies, monitored by single radial haemolysis (SRH) testing, peaked between two and four weeks post-vaccination, decreased significantly by three months post-vaccination and declined to original levels by six months post-vaccination. Of the 44 horses in the study, 18 did not exhibit an SRH increase of 25 mm<sup>2</sup> or greater to H3N8 following booster vaccination (all these had SRH levels greater than 90 mm<sup>2</sup> before vaccination) and two had no detectable increase in antibody levels. There was a significant correlation between SRH antibody level at time of vaccination and the antibody response: the lower the pre-existing SRH antibody level at time of vaccination, the greater the increase in SRH antibody level in response to booster vaccination. The authors suggest it would be advantageous to monitor SRH levels and to vaccinate strategically (Gildea et al. 2011).

Paillot et al. (2013) also suggest benefits of individual monitoring of protective SRH antibody responses before events such as races, export and/or before booster vaccinations. Paillot et al. (2013) note that vaccination closer to the time of entry into pre-export quarantine could be beneficial.

### 4.2.3 Current biosecurity measures

Australia's current biosecurity measures for EI differ to the recommendations in the Code (OIE 2009b). The horse IRA determined that other than country freedom, no single risk management option reduced the unrestricted risk of EI sufficiently to achieve Australia's appropriate level of protection (ALOP). The horse IRA determined that the combination of premises status, pre-export and post-arrival diagnostic testing, vaccination, pre-export quarantine and post-arrival quarantine achieved Australia's ALOP.

### 4.2.4 Risk review

EI is present in approved countries but is not present in Australia, where it is a nationally notifiable animal disease (DAFF 2011). Based on the preceding information and consistent with the risk assessment in the horse IRA the unrestricted risk associated with EI has not changed. Risk management measures continue to be warranted. This risk review considers if risk management measures remain appropriate and takes into account stakeholder comments.

## Vaccination

Since implementation of the measures described in the horse IRA, the inability to source vaccines for EI containing updated virus strains in all approved countries has resulted in issues with compliance, leading to an increased administrative burden and higher costs to industry. As such, mandating a vaccine strain to be used in EI vaccination requirements has been removed and replaced with a recommendation to use the latest strains available. This will bring the published policy into line with current operational realities and so, in practical terms, does not change the level of risk management. Likewise, the reference to manufacturer's recommendations has been removed. Manufacturer's recommendations for vaccine protocols vary widely, resulting in issues with compliance in determining if a particular schedule corresponds to the manufacturer's recommendations. The certifying Official Veterinarian will determine that the horse has had a primary course/booster (as applicable) in the required timeframe before export. Vaccination is only one part of risk management for EI, and is considered in conjunction with all other biosecurity measures.

Vaccines for EI have been shown to significantly reduce clinical signs and to prevent virus shedding in ponies challenged two weeks after their second vaccination (Daly et al. 2007; Edlund Toulemonde et al. 2005; Paillot et al. 2006; Paillot et al. 2008). Therefore 14 days was determined to be the minimum length of time required for horses to develop an adequate immune response before commencement of pre-export quarantine. To reflect this, the timeframe for the most recent vaccination (second of a primary course or a booster) before commencement of pre-export quarantine has been changed in the biosecurity measures from 21–90 days to 14–90 days.

Measurement of antibody levels by SRH testing was considered a potential risk management option for EI. It would be useful to identify animals with low levels of immunity (for example, poor vaccine responders). However, modern vaccines can produce cell-mediated immune responses which cannot be measured by the SRH test. SRH antibody levels may not adequately measure immunity to currently circulating viral strains. The SRH test for EIV is not available or practical for all approved countries to perform. Measurement of SRH antibody levels as a risk management option was not considered further.

## Pre-export quarantine

The respiratory route and contaminated fomites (including personnel and vehicles) are both important in the epidemiology of EI spread. There is inconclusive evidence for many of the other suggested methods of spread. The patterns of disease spread observed during the outbreak of EI in Australia, in which the horse population was largely naive to EIV, are not the patterns that would be expected in countries where EI is endemic.

Pre-export quarantine in an approved facility remains necessary to achieve Australia's ALOP. To best take into account the different circumstances in each case, potential pre-export quarantine facilities will be assessed individually. In doing so, DAFF will refer to the pre-export quarantine facility assessment guidelines at Appendix B.

The separation distance required between vaccinated horses in a pre-export quarantine facility and horses in the general population is a key issue in the pre-export quarantine facility assessment and approval process. However, the required separation distance is difficult to quantify for all the different situations that could arise. The guidelines in Appendix B are designed to assist with this. The risk of introduction of EIV into the

pre-export quarantine facility and the consequence that the consignment would be ineligible for export if this occurred was considered.

For horses in open air, 50 metres separation from horses outside the isolation facility is considered by DAFF an acceptable distance to adequately manage the risk associated with airborne spread of virus. Horses kept in barns or behind solid fences that impede airflow may be allowed reduced separation distances. The separation distance requirement is considered in conjunction with all other biosecurity measures, including taking temperatures twice-daily and the testing schedule in pre-export and post-arrival quarantine for type A influenza virus. Other biosecurity measures such as showering and changing clothing before entering the pre-export quarantine facility, and cleaning and disinfection of transport vehicles and equipment before entry into the pre-export quarantine facility are retained to manage the risk of fomite transmission of EIV.

The biosecurity measures have been amended to reflect the change to the separation requirement for horses during pre-export quarantine as described above. The requirement for at least 100 metres separation between imported horses and the general horse population is retained for post-arrival quarantine (see 'Post-arrival quarantine' below).

### Diagnostic testing

PCR testing is considered to be the most sensitive method for diagnosis of EI. PCR testing requirements will be maintained, including the timing of sampling.

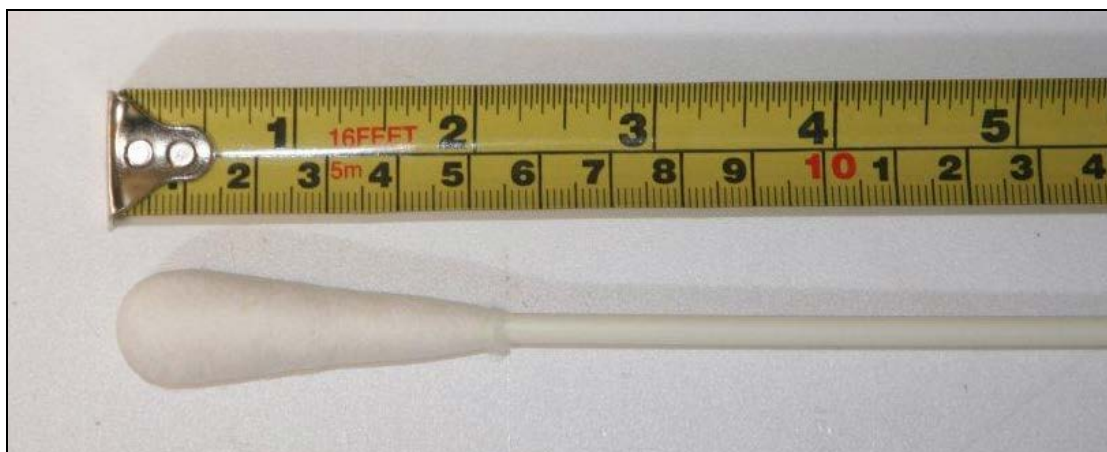
A pan-reactive influenza type A real-time RT-PCR assay targeting the matrix gene is to be used for EIV testing because it can detect any strain of influenza virus and would be less likely than other PCR assays to miss a variant strain if one arose (Read et al. 2012). Laboratories performing avian influenza surveillance should be able to test using the EI matrix gene PCR assay. Therefore, no practical impediments to specifying this test are envisaged in any approved country.

Given the lack of sensitivity of currently available antigen detection assays, these will not be added to the testing protocol. However, testing protocols will be reviewed if new peer-reviewed scientific information is published.

Collection of diagnostic samples for testing using nasopharyngeal swabs is currently required as a biosecurity measure for EI. There is insufficient evidence to support replacing the use of nasopharyngeal swabs with nasal swabs for sampling for PCR testing. Nasopharyngeal swab samples have been shown to be superior to nasal swab samples, with increased frequency and amount of virus able to be detected (Paillot et al. 2013). Although nasal samples were successfully used for PCR testing in the EI outbreak in Australia (Kirkland 2011), involving acutely infected and previously naive horses, the diagnostic sensitivity of the PCR assay may be reduced by using nasal swabs rather than nasopharyngeal swabs in vaccinated horses. This will be reviewed if new peer-reviewed scientific information is published.

Diagnosis of EI is facilitated by using transport media and nasopharyngeal swabs with a large surface area: Figure 4.1 shows a large (55 mm x 15 mm) rayon fibre swab on a 500 mm flexible plastic rod, which when used unguarded, samples the entire length of the nasopharynx (Dr R. Newton, Animal Health Trust, United Kingdom, pers. comm. June 2012). This policy review therefore considers that large surface area swabs be used for nasopharyngeal sampling. However, it is recognised that Veterinary

Authorities may require nasopharyngeal samples to be taken with specific materials available in the country of export.



**Figure 4.1.** Detail of nasopharyngeal swab tip with large surface area. Photo supplied by Dr R. Newton, Animal Health Trust, United Kingdom.

Stakeholders raised concerns about collecting nasopharyngeal swabs in young horses. Although nasopharyngeal swabs are preferable, for foals under six months of age, the use of nasal swabs is considered acceptable. Foals that are accompanying their dam are likely to be of a similar disease status to their dam, so allowing opportunity to detect infection in the dam.

Monitoring of rectal temperatures is effective for early detection of EI, including in vaccinated horses. The current biosecurity measures require each horse to have a rectal temperature taken and recorded twice daily, at least eight hours apart, for the duration of pre-export and post-arrival quarantine. If the temperature is 38.5 °C or higher, action must be taken. It is recognised that foals can have a slightly higher normal temperature than adult horses. For foals under six months of age, this temperature threshold will be increased to 39 °C.

Implantable percutaneous thermal sensing microchips for monitoring of body temperature currently lack sensitivity for routine use as a risk management method. Their use is subject to continued scientific review.

The current biosecurity measures require each horse to have a reference serum sample taken close to the time of commencement of pre-export quarantine and stored until the horse has completed post-arrival quarantine after arrival in Australia. This has not been demonstrated to contribute to the management of risk associated with the importation of horses and is onerous for Veterinary Authorities of exporting countries. Therefore, this requirement will be removed from the biosecurity measures. The requirement for a reference serum sample to be taken within 24 hours of arrival into the post-arrival quarantine facility and stored will be retained.

### Post-arrival quarantine

The biosecurity risk in post-arrival quarantine is different to that of pre-export quarantine, as horses in the population outside post-arrival quarantine are mostly naive to EIV. The consequences of an EI outbreak are unacceptable to Australia and the costs well documented (Callinan 2008). Therefore, the requirement for at least 100 metres separation between the imported horses and the general horse population is

retained. Post-arrival quarantine facilities will not be permitted in areas with high horse populations.

Other biosecurity requirements such as showering and changing clothing before leaving the post-arrival quarantine facility, and cleaning and disinfection of transport vehicles and equipment before removal from the post-arrival quarantine facility will be retained to reduce the risk of fomite spread of EIV.

The OIE recommendations for EI vaccines in 2011 and 2012 were that vaccines for the international market should contain both clade 1 and clade 2 viruses of the Florida sublineage and no longer need to contain the Eurasian lineage (OIE 2011a; OIE 2012d). The horse IRA stated that Florida sublineage clade 1 viruses appear to predominate in North America and clade 2 viruses predominate in Europe (Bryant et al. 2009). Data from 2008 to 2009 show that Florida clades 1 and 2 were circulating in Europe; more clade 1 viruses were isolated in 2009 than 2008, suggesting that clade 1 viruses were becoming more widespread in the United Kingdom (Bryant et al. 2011). As such, the biosecurity risk posed from commingling of horses from different regions of the world in post-arrival quarantine is considered to be considerably reduced since the horse IRA was finalised. This policy review therefore considers that a 14-day post-arrival quarantine period, in conjunction with other biosecurity measures, is acceptable.

#### 4.2.5 Conclusion

EI is present in approved countries but is not present in Australia, where it is a nationally notifiable animal disease (DAFF 2011). Based on the preceding information, risk management for EI continues to be warranted with some amendments. The combination of premises freedom, vaccination, pre-export and post-arrival quarantine and diagnostic testing, are considered appropriate biosecurity measures.

#### Biosecurity measures for equine influenza

The following biosecurity measures apply to horses, donkeys and mules (including foals), unless otherwise specified. In this context, 'horse' refers to horses, donkeys and mules.

For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of equine influenza occurred during the previous 12 months before export, vaccination against equine influenza is not practised, and the disease is compulsorily notifiable.

#### OR

For all horses including unweaned foals under six months of age, except where otherwise specified:

For 21 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of equine influenza occurred during the previous 30 days before export.

#### AND

The horse (other than foals under six months of age) was vaccinated against equine influenza 14–90 days before commencement of pre-export quarantine with a complete primary course, the final of a primary course, or a booster to a primary course, using a registered vaccine.

Vaccines containing the most up-to-date equine influenza vaccine virus strains available should be used.

**AND**

The horse was held in pre-export quarantine in a facility approved by DAFF and the Veterinary Authority in the country of export for at least 14 days immediately before export. During this time the horse was isolated from equids not of equivalent equine influenza status.

**AND**

Nasopharyngeal samples (nasal samples for foals under six months of age) were taken from the horse four to six days after commencement of pre-export quarantine and during the four days before leaving the pre-export quarantine facility and tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene with negative results in each case.

**AND**

For the duration of pre-export quarantine the rectal temperature of the horse was taken and recorded twice daily at least eight hours apart. If the temperature was 38.5 °C or higher (39.0 °C or higher for foals under six months of age) on two consecutive recordings, or other signs of infectious respiratory disease were present, a nasopharyngeal sample (nasal sample for foals under six months of age) was taken and tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene and DAFF was notified within 48 hours. If the temperature was not taken for any reason on two consecutive occasions, DAFF was notified within 48 hours and a clinical examination by a registered veterinarian performed. Temperature records must be kept until completion of post-arrival quarantine.

**AND**

**For horses originating from a single pre-export quarantine facility:**

The horse must be held in post-arrival quarantine for at least 14 days. During this time the horse must be isolated from equids not of equivalent equine influenza status **and** nasopharyngeal samples (nasal samples for foals under six months of age) must be taken from the horse four to six days after commencement of post-arrival quarantine and within four days of release from post-arrival quarantine and tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene with negative results in each case.

**OR**

**For horses originating from multiple pre-export quarantine facilities:**

The horse must be held in post-arrival quarantine for at least 14 days. During this time the horse must be isolated from equids not of equivalent equine influenza status **and**

the period of intake of multiple consignments into the post-arrival quarantine facility should be kept to a minimum. The post-arrival quarantine period will commence from the time of entry into the facility of the last horse of the post-arrival quarantine intake **and**

nasopharyngeal samples (nasal samples for foals under six months of age) must be taken from the horse within 24 hours of arrival into the post-arrival quarantine facility and four to six days after commencement of post-arrival quarantine and within four days of release from post-arrival quarantine and tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene with negative results in each case.

**AND**

For the duration of post-arrival quarantine, the horse must not be held, housed or exercised within 100 metres of other equids not of equivalent equine influenza status.

**AND**

A reference serum sample must be taken from the horse within 24 hours of arrival into the post-arrival quarantine facility and stored at the National Animal Serum Bank at the Australian Animal Health Laboratory.

**AND**

For the duration of post-arrival quarantine the rectal temperature of the horse must be taken and recorded twice daily at least eight hours apart. If the temperature is 38.5 °C or higher (39.0 °C or higher for foals under six months of age) on two consecutive recordings or other signs of infectious respiratory disease are present, a nasopharyngeal sample (nasal sample for foals under six months of age) must be taken and tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene and DAFF notified on the same day. If the temperature cannot be taken for any reason on two consecutive occasions, DAFF must be notified on the same day and a clinical examination by a registered veterinarian performed. Temperature records must be made available for inspection by DAFF.

**Requirements for pre-export quarantine include:**

The pre-export quarantine facility was approved by DAFF and the Veterinary Authority in the country of export.

All personnel entering the pre-export quarantine facility during pre-export quarantine must shower and change clothing on entry. Alternatively, they may shower off-site and must have no contact with horses or horse facilities between showering and entering the pre-export quarantine facility. Outer clothing used in the pre-export quarantine facility should be freshly laundered or dedicated to the facility and stored on site or be disposable. Footwear used in the pre-export quarantine facility should be cleaned and disinfected before entry or dedicated to the facility and stored on site, or disposable covering should be used over existing footwear.

All equipment used in feeding, handling and treating the horse in pre-export quarantine must be new or cleaned and disinfected with a product effective against equine influenza virus before use and must be used only in the pre-export quarantine facility for the duration of pre-export quarantine.

Horses in pre-export quarantine must not access any areas used by other horses unless specifically authorised by DAFF.

Vehicles for transporting horses from the pre-export quarantine facility to the place of export must be cleaned and disinfected with a product effective against equine influenza virus.

**Requirements for post-arrival quarantine include:**

The post-arrival quarantine facility must provide a separation of at least 100 metres from other equids not of equivalent equine influenza status.

All personnel entering the post-arrival quarantine facility during post-arrival quarantine must wear dedicated or disposable outer clothing and dedicated, cleaned and disinfected or disposable footwear. All personnel must shower and change outer clothing before leaving the post-arrival quarantine facility. Outer clothing and footwear used within the post-arrival quarantine facility must be cleaned to the satisfaction of DAFF before removal from the facility.

All equipment used in feeding, handling and treating the horse in post-arrival quarantine must either be cleaned and disinfected with a product effective against equine influenza virus to the satisfaction of DAFF before removal from the post-arrival quarantine facility, or remain on-site for the duration of post-arrival quarantine and then be released with DAFF approval at the completion of post-arrival quarantine.

Vehicles for transporting horses are not permitted to leave the post-arrival quarantine facility until thoroughly cleaned and disinfected to the satisfaction of the DAFF officer.

NOTE: A single consignment can be split between post-arrival quarantine facilities on arrival in Australia. If consignments are split, the status of one portion of the consignment may affect the status of the other portion. If the release from post-arrival quarantine of one portion is delayed for biosecurity reasons, the release of the other portion in a separate post-arrival quarantine facility may also be delayed.

## 4.3 Equine piroplasmosis

### 4.3.1 Background

Equine piroplasmosis is a widespread, tick-borne protozoal disease of equids caused by *Babesia caballi* and *Theileria equi*. In clinically affected horses it is characterised by pyrexia and acute anaemia, but exists in a latent form in endemic areas, with relapses occurring in response to stress and compromised immunity. Equine piroplasmosis is an OIE-listed disease (OIE 2012e).

Relevant and new information was considered in this policy review of the horse IRA. For further information on piroplasmosis refer to the horse IRA (Biosecurity Australia 2010).

### 4.3.2 Technical information

#### Epidemiology

##### Agent

Three genotypes were described for *T. equi* and two for *B. caballi* (Bhoora et al. 2009; Kouam et al. 2010b; Kouam et al. 2010c). Differing regional prevalence and pathogenicity were found for *T. equi* genotypes (Bhoora et al. 2010b; Bhoora et al. 2010a; Bhoora et al. 2010c; Nagore et al. 2004). Variation between genotypes may also explain some of the variable sensitivity of molecular testing for piroplasmosis (Bhoora et al. 2010c).

##### Transmission

Equine piroplasmosis is transmitted between equids by ixodid ticks, iatrogenically from blood contaminated fomites or transplacentally (Allsopp et al. 2007; Chhabra et al. 2012; Georges et al. 2011; Kumar et al. 2008). It is unclear if transfer can occur via lactation, although piroplasm specific antibodies were found in horse colostrum (Allsopp et al. 2007). The horse IRA noted more than 15 species of ticks capable of transmitting piroplasmosis. Currently, twenty-two species of ixodid tick are identified as potential vectors (Jaffer et al. 2010; Scoles et al. 2011; USDA 2011). *B. caballi* may be transmitted transovarially but transfer was inefficient (de Waal 1990; Ueti et al. 2008). Transstadial transmission by multiple host ticks and male ticks transferring between horses are the main modes of tick-borne transmission.

In the United States, since completion of the horse IRA, there were confirmed cases of equine piroplasmosis in Florida, New Mexico and Texas (USDA 2011). Suitable multiple host vectors are important for the widespread propagation of disease as was seen in the Texas epidemic where *Amblyomma cajennense* (a three host tick) was associated with transmission (Scoles et al. 2011). There are three tick species present in Australia that are known to be capable of transmitting equine piroplasmosis (*Rhipicephalus (Boophilus) microplus*, *R. sanguineus* and *Haemaphysalis longicornis*). Both *R. sanguineus* and *H. longicornis* are three host ticks. *H. longicornis* transmission was shown only experimentally (Ikadai et al. 2007). The ability of other Australian ticks to act as vectors for equine piroplasmosis is unknown.

Co-location of horses and cattle, resulting in high vector density, high host density and contact between horses and cattle was identified as a risk factor for equine piroplasmosis (USDA 2011).

##### Other hosts

Other animals may act as reservoirs of equine piroplasmosis infection for horses. Donkeys (Acici et al. 2008; Machado et al. 2012), mules (Acici et al. 2008) and zebras (Bhoora et al. 2010a) may be important sources of disease in endemic countries. Both agents were also reported in camels (Qablan et al. 2012) and dogs (Beck et al. 2009; Criado-Fornelio et al. 2003; Fritz 2010). However, the low prevalence of infection in non-equid species makes them unlikely to act as sources of piroplasmosis infection (Sloboda et al. 2011). The potential for native Australian mammals to act as hosts for equine piroplasms is unknown.

## Prevalence

The known regional distribution of equine piroplasmosis has changed since publication of the horse IRA. Recent reports suggest the disease may be more widespread (Butler et al. 2012; OIE 2009d; Scoles et al. 2011; Short et al. 2012; USDA 2011; USDA:APHIS:VS 2009). Outbreaks from the failure to detect infected horses during pre-export screening have become more common (OIE 2009d; Short et al. 2012; USDA 2011; USDA:APHIS:VS 2009). Local transmission was reported in the Netherlands (Butler et al. 2012). Iatrogenic transmission was associated with an outbreak amongst quarter horses in Missouri (Traub-Dargatz et al. 2010; USDA:APHIS:VS 2009) and Florida in the United States (Short et al. 2012; Traub-Dargatz et al. 2010; USDA:APHIS:VS 2009), while another epidemic in Texas was propagated by ticks (Scoles et al. 2011). Iatrogenic transmission from an undetected infected imported horse was also important in the 2009 outbreak in Ireland (OIE 2009d). In countries with confirmed cases of equine piroplasmosis, prevalence ranges from 4% in the Netherlands (Butler et al. 2012) to over 90% in countries such as Mongolia (Sloboda et al. 2011).

The predominant equine piroplasmosis agent in most endemically infected countries is *T. equi*. Higher seroprevalence of *B. caballi* was observed in Brazil (Kerber et al. 2009), Trinidad (Asgarali et al. 2007), Turkey (Acici et al. 2008) and Venezuela (Mujica et al. 2011). Three genotypes (A, B and C) were identified for *T. equi* based on sequencing of 18S rRNA. *T. equi* may be in the process of a speciation event (Kouam et al. 2010b; Kouam et al. 2010c). The A genotype is widespread and is the traditionally identified genotype. The B genotype was found in equids in Greece (Kouam et al. 2010b), Spain (Nagore et al. 2004) and South Africa (Bhoora et al. 2010a). This B genotype may be more virulent (Kouam et al. 2010b; Kouam et al. 2010a) and has higher incidence in horses with clinical signs or those exposed to vectors in Spain (Nagore et al. 2004). Genotype C was found in equids in South Africa (Bhoora et al. 2010a) but differences in virulence for this genotype are not known. Two genotypes for *B. caballi* were identified in horses in South Africa (Bhoora et al. 2009).

## Clinical signs

For a discussion of the clinical signs and incubation period, see the horse IRA (Biosecurity Australia 2010).

## Diagnosis

Diagnosis of equine piroplasmosis is complicated by the non-specific and variable clinical signs of the disease. All current diagnostic tests rely upon testing of blood for either the agents or specific antibodies. The low levels of parasitaemia found in inapparent carriers may make detection difficult.

## Blood smears

Traditionally, equine piroplasmosis was diagnosed by the presence of the agent(s) in Giemsa-stained blood smears in conjunction with the clinical signs. This method is dependent upon high levels of parasitaemia, often only seen in acutely infected horses.

## Serology

Serological testing for agent specific antibodies is recommended for diagnosis of equine piroplasmiasis by the OIE (OIE 2008a) and is used by most countries for screening imported horses. It is unclear how colostral antibodies, secreted by carrier mares (Allsopp et al. 2007; Kumar et al. 2008), may affect testing of unweaned foals.

The indirect fluorescent antibody test (IFAT) and the competitive enzyme-linked immunosorbent assay (cELISA) are the OIE prescribed serological tests for international trade. Antibodies detected in these tests are specific for each agent. Equine merozoite antigen 1 (EMA-1) is the antigen detected by cELISA for *T. equi* but there is heterogeneity in the gene that encodes the antigen (Bhoora et al. 2010c). This may explain some of the inconsistency seen in testing results. Other serological tests mentioned in the literature include the indirect ELISA (iELISA) (Asenzo et al. 2008) and the dot ELISA (Kumar et al. 2008). The iELISA gives similar results to the cELISA (Asenzo et al. 2008), while interpretation of the dot ELISA is laborious and subjective.

All serological tests have problems with cross reactivity, antibody detection limits and lack of standardisation. The IFAT is subjectively assessed, making standardisation of results across laboratories difficult. There are also concerns about standardisation within and between laboratories for the cELISA (Bhoora et al. 2010d). Potential cross reactions with other pathogenic or non-pathogenic protozoa raise concerns about the sensitivity and specificity of IFAT and cELISA.

Antibody detection limits can make detection of acutely infected horses and subclinically infected carriers inaccurate. Seropositivity (as determined by IFAT) in acutely infected horses was found from as early as 15–17 days (Bhoora et al. 2010b) to as late as six weeks after exposure (Butler et al. 2012). Carrier animals have low levels of parasitaemia and equine piroplasm specific antibodies, making them difficult to detect by all serological testing. While IFAT and cELISA were shown to have similar sensitivity (Bhoora et al. 2010b; Jaffer et al. 2010; Shkap et al. 1998), the IFAT is more sensitive for detecting *T. equi* infections in the earlier stages than cELISA (Huang et al. 2006). To overcome these limitations, using two serological tests (cELISA and complement fixation test) was suggested to increase the positive predictive value (USDA 2011).

## Molecular testing

Molecular testing techniques include routine PCR, loop-mediated isothermal amplification, nested PCR, reverse line blot PCR (RLB-PCR), real time PCR, TaqMan PCR and multiplex PCR. These techniques are faster, more sensitive and more specific than serological tests. They detect infected horses earlier than serological methods (Bhoora et al. 2010c; Butler et al. 2012) as they amplify very low levels of *T. equi* and or *B. caballi*. Variation and unreliability sometimes seen in the literature were mainly due to high heterogeneity in the amplicon (i.e. improper probe choice), poor controls and lack of validation.

Most molecular tests are based on amplification of 18S rRNA and less frequently EMA-1 or 16S rRNA. However, high levels of heterogeneity were reported within 18S rRNA (Bhoora et al. 2009) and EMA-1 (Bhoora et al. 2010c). Amplification of the hypervariable region within 18S rRNA may have contributed to the poor detection rates seen in early studies when compared to serological testing. Use of more sensitive techniques, such as nested PCR (Baldani et al. 2007) and TaqMan probes (Bhoora et

al. 2010c; Kim et al. 2008), in conjunction with more conservative probe design and validation have overcome these problems.

Molecular techniques can also allow the detection of multiple agents in one sample. Both equine piroplasms, including their different genotypes and other piroplasms were detected by multiplex PCR (Alhassan et al. 2005) and RLB-PCR (Bhoora et al. 2009; Kouam et al. 2010b; Kouam et al. 2010a). Testing by RLB-PCR in Greece identified 47.14% overall infection rates (Kouam et al. 2010b) in an area with 11.6% seroprevalence by cELISA (Kouam et al. 2010a). This higher prevalence identified by molecular testing may represent greater detection of genotypes and carrier horses. These newer technologies have the potential to simplify and streamline diagnostic testing but currently require validation or special equipment.

Molecular testing methods are likely to become valuable tools for diagnosis of equine piroplasmiasis in the future. There is increasing use of molecular tests to validate and complement serological testing in prevalence studies (Butler et al. 2012; Short et al. 2012; Traub-Dargatz et al. 2010). Currently, only serological tests are recommended by the OIE for pre-export screening of equine piroplasmiasis (OIE 2008a). As molecular tests become more widely available and better validated, their role in pre-export screening will be reconsidered.

### Culture

Equine piroplasms can be cultured (Baldani et al. 2007) and then examined by smears or molecular testing. This method was used to detect low level parasitaemias (Alhassan et al. 2007; Zwegarth et al. 1997) but is time consuming and expensive. The time required for results using tissue culture varies depending on the level of parasitaemia and the detection method (i.e. PCR or smears), but ranges from 2 to 15 days (Alhassan et al. 2007; Baldani et al. 2007).

### Treatment

Imidocarb can temporarily suppress *T. equi* growth (Butler et al. 2008) but there are conflicting reports on its efficacy for *B. caballi* (Butler et al. 2008; Hailat et al. 1997; Rashid et al. 2009; Rashid et al. 2008; Schwint et al. 2009). Epoxomicin (AbouLaila et al. 2010) and ponazuril (Wise et al. 2012) inhibit the growth of equine piroplasms *in vitro* but have not been assessed in clinical trials. Treatment may have some benefit in elimination of clinical signs of piroplasmiasis but it is unclear if horses clear infection or become subclinically infected carriers (Hailat et al. 1997; Rashid et al. 2009; Rashid et al. 2008; Grause et al. 2012; Ueti et al. 2012). Ueti et al. (2012) examined the effect of imidocarb on *T. equi*, finding horses negative on PCR testing were frequently positive by cELISA testing up to 12 months following treatment.

### 4.3.3 Current biosecurity measures

Australia's current biosecurity measures for equine piroplasmiasis differ to those in the Code (OIE 2009c). The horse IRA determined that other than country freedom, no single risk management option reduced the unrestricted risk of equine piroplasmiasis sufficiently to achieve Australia's ALOP. The horse IRA determined that the combination of premises status, pre-export quarantine, diagnostic testing (by IFAT), and inspection and treatment for ticks pre-export and post-arrival achieved Australia's ALOP.

#### 4.3.4 Risk review

Equine piroplasmosis is present in approved countries but is not present in Australia, where it is a nationally notifiable animal disease (DAFF 2011). Based on the preceding information, the risk assessment in the horse IRA and the change in the regional distribution, the biosecurity risk associated with equine piroplasmosis has increased since the horse IRA was finalised. Risk management measures continue to be warranted. Current biosecurity measures for equine piroplasmosis were no longer considered adequate.

Since the horse IRA was finalised, reports of equine piroplasmosis suggest a wider international distribution of piroplasmosis. Current measures require either country freedom or premises freedom and testing. As the prevalence of equine piroplasmosis has increased, the effectiveness of country and premises freedom residency was considered in this policy review. The country freedom residency requirement is increased from 60 days to since birth.

The current measures require testing of horses by IFAT on one blood sample collected four to six days after the start of pre-export quarantine. Failure to detect infected horses (false negatives) is a problem when using a single diagnostic test (USDA 2011). Importation of undetected carriers was associated with outbreaks in other countries (OIE 2009d; Short et al. 2012; USDA:APHIS:VS 2009). Changing testing requirements from an IFAT to a cELISA would not address the problems associated with detecting sub-clinical carriers, and was not considered a suitable risk management option. Instead, a multiple diagnostic approach on single blood samples, as used in recent studies and outbreak management (Butler et al. 2012; Traub-Dargatz et al. 2010), was considered appropriate as it will reduce the likelihood of sub-clinical carriers remaining undetected. Using both IFAT and cELISA for both equine piroplasms on the same sample is the most robust current screening method for *T. equi* and *B. caballi*. As molecular tests become more widely available and validated, their use in pre-export screening will be further considered.

Current measures require that horses were not treated with anti-babesial agents for 60 days before pre-export quarantine. High dose repeated imidocarb treatments may reduce parasitaemia to undetectable levels (by PCR) for up to 12 months for both equine piroplasms (Butler et al. 2008; Ueti et al. 2012). Anti-babesial treatments may mask the clinical signs and diagnosis of equine piroplasmosis, and the duration of such effects is unclear. Serology is considered to be less sensitive than PCR to low level infection (Bhoora et al. 2010c; Butler et al. 2012) and the effect of anti-babesial treatments on detection by serological methods is uncertain. A recent study found imidocarb treatment cleared *T. equi* detection in horses by nested PCR but not by cELISA at 12 months after treatment (Ueti et al. 2012). In addition, these studies cannot rule out that horses that were serologically negative for *T. equi* following imidocarb treatment were not latent carriers (Grause et al. 2012, Ueti et al. 2012). With this uncertainty in reliability of detection of piroplasmosis after treatment, a declaration that imported horses have not been treated with anti-babesial agents for at least 12 months before commencement of pre-export quarantine was considered an appropriate biosecurity measure. Should more effective anti-babesial treatments become available, biosecurity measures will be considered accordingly.

Current biosecurity measures require that horses be isolated in pre-export quarantine for 14 days immediately before export and certification that there is no opportunity for iatrogenic transmission to occur in pre-export quarantine. Iatrogenic transmission of both *T. equi* and *B. caballi* was associated with outbreaks in Ireland (OIE 2009d) and

the United States (Short et al. 2012). These requirements for pre-export quarantine and certification of no iatrogenic transmission remain appropriate biosecurity measures.

Examination of horses for ticks is currently required at several points during pre-export and post-arrival quarantine. Although supervised by the Veterinary Authority, these checks are difficult to standardise and ticks can be missed. As most ticks transmit equine piroplasms transstadially, and transmission of *B. caballi* transovarially is very inefficient (de Waal 1990; Ueti et al. 2008), ticks themselves are less likely reservoirs of *T. equi* and *B. caballi* than carrier horses. This does not negate the importance of thorough checks for ticks, which not only act as vectors for piroplasmosis but may also be exotic pests in their own right. Thorough tick searches, parasiticide treatment and testing, in conjunction with other biosecurity measures were considered adequate to reduce the risk of importation of horses with equine piroplasmosis and/or exotic ectoparasites.

The measures that were adopted following the horse IRA require testing of samples taken during pre-export quarantine and horses which test positive for piroplasmosis were eligible for import 60 days later, if subsequent tests were negative. Due to the chronic nature of piroplasmosis, the potential for false negative test results and the potential of anti-babesial agents to interfere with testing, this measure was no longer considered acceptable. Unless additional testing by an OIE reference laboratory can confirm the original positive test results as false positives, horses with positive piroplasmosis tests in pre-export quarantine will not be eligible to re-start the pre-export quarantine process for 12 months.

Additional testing for piroplasmosis of in-contact horses within the post-arrival quarantine facility is required if ticks are found on any horse in a consignment during post-arrival quarantine.

### 4.3.5 Conclusion

Equine piroplasmosis, caused by both *T. equi* and *B. caballi*, is present in approved countries but is not present in Australia, where it is a nationally notifiable animal disease (DAFF 2011). Based on the preceding information, risk management for equine piroplasmosis continues to be warranted with some amendments.

Developments in the prevalence, diagnosis and understanding of transmission of equine piroplasmosis require implementation of more robust pre-export biosecurity measures. However, regardless of these measures, equine piroplasmosis carrier horses may remain undetected due to limitations in all diagnostic tests.

The combination of horse testing and treatment history, premises freedom, pre-export quarantine, diagnostic testing (by IFAT and cELISA), and inspection and treatment for ticks pre-export and post-arrival are considered appropriate biosecurity measures. The use of diagnostic tests in parallel is expected to increase testing sensitivity.

### Biosecurity measures for equine piroplasmosis

The following biosecurity measures apply to horses, donkeys and mules (including foals), unless otherwise specified. In this context, 'horse' refers to horses, donkeys and mules.

Since birth the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of equine piroplasmosis

occurred during the previous two years before export and the disease is compulsorily notifiable.

**OR**

For all horses including unweaned foals under six months of age:

For 60 days immediately before export the horse did not reside on any premises where clinical, epidemiological or other evidence of equine piroplasmosis occurred during the previous 60 days before export.

**AND**

After due inquiry, the horse was not treated with imidocarb or other anti-babesial agents active against *Babesia caballi* or *Theileria equi*, during the 12 months before commencement of pre-export quarantine.

**AND**

After due inquiry, the horse was not positive in any test for equine piroplasmosis (*B. caballi* or *T. equi*) for at least 12 months before the commencement of pre-export quarantine, **or**

After consultation with DAFF, the horse was confirmed negative for equine piroplasmosis (*B. caballi* and *T. equi*) by an OIE reference laboratory using both an indirect fluorescent antibody test (IFAT) and competitive enzyme-linked immunosorbent assay (cELISA) as described in the OIE Manual on a single serum sample.

**AND**

The horse was held in pre-export quarantine for at least 14 days immediately before export. During this time the horse was isolated from animals not of equivalent piroplasmosis status.

**AND**

During pre-export quarantine there was no opportunity for iatrogenic transmission.

**AND**

Within 24 hours after commencement of pre-export quarantine the horse was thoroughly examined for ticks under the direct supervision of an Official Veterinarian. A systematic approach was undertaken and the entire horse was examined, with particular attention to the ears, false nostrils, under-body areas (axilla, inguinal region and under the jawbone), perineum, mane and tail.

**AND**

After examination for ticks, and within 24 hours after commencement of pre-export quarantine the horse was treated, under the direct supervision of the Official Veterinarian, with a parasiticide effective against ticks (date and treatment schedule stated on the veterinary certificate).

**AND**

If any horse in the pre-export quarantine facility was found to have ticks at commencement or during pre-export quarantine, the ticks were removed and all horses in the facility were treated within 24 hours and again seven days later with a parasiticide effective against ticks (date and treatment schedule stated on the veterinary certificate).

#### AND

The horse was tested for both *B. caballi* and *T. equi* using both an IFAT and cELISA as described in the OIE Manual on a single blood sample, which was taken at least four days after commencement of pre-export quarantine, and with negative results for all tests, **or**

After consultation with DAFF, the horse was confirmed negative for equine piroplasmiasis (*B. caballi* and *T. equi*) by an OIE reference laboratory using both an IFAT and cELISA as described in the OIE Manual on a single serum sample which was taken at least four days after commencement of pre-export quarantine.

NOTE: If there is no recognised laboratory in the country of export, testing in another country must be conducted in a laboratory recognised by the Veterinary Authority of the country of export.

#### AND

Within 24 hours of arrival at the post-arrival quarantine facility, the horse was thoroughly examined for ticks by a registered veterinarian under the direct supervision of the DAFF veterinarian. A systematic approach was undertaken and the entire horse was examined with particular attention to the ears, false nostrils, under-body areas (axilla, inguinal region and under the jawbone), perineum, mane and tail.

#### AND

If any horse in the post-arrival quarantine facility was found to have ticks, the ticks were removed and all horses in the facility were treated within 24 hours, under the direct supervision of the DAFF veterinarian, with a parasiticide effective against ticks and that horse was tested for both *B. caballi* and *T. equi* at least 11 days after treatment for ticks.

## 4.4 Equine viral arteritis

### 4.4.1 Background

Equine viral arteritis (EVA) is caused by equine arteritis virus (EAV). Clinical signs of EVA are variable but commonly pyrexia, panvasculitis, respiratory compromise and abortions are seen. One serotype of EAV is recognised with variable pathogenicity between strains. EVA is an OIE-listed disease (OIE 2012e).

Relevant and new information was considered in this policy review of the horse IRA. For further information on EVA refer to the horse IRA (Biosecurity Australia 2010).

## 4.4.2 Technical information

### Epidemiology

#### Agent

EAV is an arterivirus in the family Arteriviridae, order Nidovirales. EAV strains are characterised by antigenic heterogeneity affecting the cross neutralisation strength of antibodies to EAV (Echeverría et al. 2010). Mutation of EAV and new strain emergence is an issue for characterisation, diagnosis and pathogenicity of EVA (Lu et al. 2008). Within carrier stallions, a high rate of mutation can occur (Balasuriya and MacLachlan 2004; Echeverría et al. 2010; Mischczak et al. 2012), leading to multiple strains from the same stallion being associated with recent outbreaks (Pronost et al. 2010; Zhang et al. 2010). Strains isolated from the 2007 French outbreak were linked to a stallion confirmed as an EAV carrier in 2000 (Mischczak et al. 2012), highlighting the importance of carriers and mutation in EAV virulence.

EAV isolates are divided into European and American clades, with the European clade further subdivided into subgroups 1 and 2. Most recent isolates cluster within the European clade (Larska and Rola 2008; Metz et al. 2011; Pronost et al. 2010; Rola et al. 2011; Zhang et al. 2010). There is no published information about the phylogeny of Australian EAV strains.

#### Transmission

The importance of the carrier stallion as a reservoir (OIE 2010e) and the ability of artificial insemination with EAV contaminated semen to initiate and propagate outbreaks (OIE 2010e; Pronost et al. 2010; Zhang et al. 2010) were highlighted in recent outbreaks of EVA infection.

There is no evidence of a carrier state in mares, foetuses, foals under six months of age, or geldings (Timoney and McCollum 1988).

#### Prevalence

Confirmed cases of EAV were detected in Argentina (OIE 2010e), Belgium (Gryspeerdt et al. 2009), Croatia (OIE 2008c), France (Promed Mail 2011), Israel (OIE 2008d), Poland (Larska and Rola 2008; Rola et al. 2011) and the United Kingdom (OIE 2010f; OIE 2011c). Detection of EVA, with few if any clinical signs, has occurred during routine pre-breeding or export screening (OIE 2010f; OIE 2011c) and prevalence surveys (Larska and Rola 2008; OIE 2008c; Rola et al. 2011). Strains of EAV are present in Australia (Biosecurity Australia 2010), with a high prevalence in standardbreds (Huntington et al. 1990) but outbreaks of EVA are not reported. The reasons for absence of reports of outbreaks of EVA in Australia, despite high seroprevalence in some breeds, are not clear: they may be related to breed, breeding management, misdiagnosis, absence of clinical disease or non-reporting.

#### Pathogenicity

Pathogenicity of EAV infection varies considerably depending upon both agent and host factors. The high rate of mutation of EAV both *in vitro* and clinically in carrier stallions is an important factor in the variable pathogenicity of EVA. Point mutations within the EAV genome were identified as important for virulence (Zhang et al.

2008). Carrier stallions are present in Australia and given suitable circumstances could be a source of pathogenic virus resulting in an outbreak of clinical disease.

EVA is more prevalent in certain breeds, such as standardbreds (Go et al. 2011; Holyoak et al. 2008; Huntington et al. 1990; Ruiz-Sáenz 2010). A genetic basis to this host susceptibility was recently identified (Go et al. 2011; Go et al. 2012; Kalemkerian et al. 2011).

## Clinical signs

For more details of the clinical signs and incubation period, see the horse IRA (Biosecurity Australia 2010).

Most recent EVA detections result from routine screening of carrier stallions or prevalence surveys in endemic countries (Larska and Rola 2008; OIE 2010f; OIE 2011c; Promed Mail 2011; Rola et al. 2011). In these recent reports, the most common clinical signs of infection include pyrexia (Broaddus et al. 2011a; OIE 2010e; Summers-Lawyer et al. 2011; Vairo et al. 2012), nasal discharge (Broaddus et al. 2011a), abortions (Holyoak et al. 2008; Larska and Rola 2008; OIE 2008d; Promed Mail 2011) and/or neonatal death (Gryspeerd et al. 2009).

## Diagnosis

Diagnosis is usually based on virus isolation, detection of nucleic acid or viral antigen or demonstration of a specific antibody response (OIE 2008b). The virus neutralisation test (VNT) and virus isolation from semen are the current prescribed tests for EVA diagnosis (OIE 2008b).

## Serology

Serum cytotoxicity at low dilutions remains a problem for the VNT; however, interpretation of results was improved by modifications to the test protocol and changed cell lines (Legrand et al. 2007). The VNT is more sensitive and specific than other assays (Duthie et al. 2008; Go et al. 2008; Rola et al. 2011; Summers-Lawyer et al. 2011).

Changes in the antigenicity of virus neutralisation sites in EAV strains means that the choice of the reference strains in the VNT may be important. Inclusion of multiple clade reference strains may aid VNT interpretation (Echeverría et al. 2010).

## Virus isolation

EAV can be isolated from many body fluids early in the course of infection in mares and geldings, and from semen in chronically infected stallions. Virus isolation is predominantly used to identify carrier stallions after VNT indicates prior exposure to EAV (OIE 2008b). There have been no changes to virus isolation testing since the horse IRA.

## Molecular techniques

Compared to the gold standards of VNT and virus isolation, PCR is lower in sensitivity and specificity (Pronost et al. 2010; Rola et al. 2011; Summers-Lawyer et al. 2011), most likely due to the high level of polymorphism between strains. Choice of more conserved primer targets for RT-PCR may improve efficacy (Lu et al. 2008)

but currently there are no suitable molecular tests that would provide reliable screening for EVA.

### **Treatment**

Treatment of carrier stallions remains controversial. As development of the carrier state appears to be dependent upon testosterone, outbreaks in France (Pronost et al. 2010) and the United Kingdom (OIE 2010f; OIE 2011c) were controlled by castration of carrier stallions. Gonadotrophin releasing hormone antagonists or vaccination may eliminate EAV shedding in semen (Fortier et al. 2002) although the efficacy and duration of such effects is unclear.

### **Vaccination**

There is only a single serotype of EAV recognised; existing vaccines remain effective and were used recently in outbreak control in the United States and Argentina. Echeverría et al. (2010) noted differences between homologous sera and reference sera in cross neutralisation studies.

Protection from challenge with reference strains was demonstrated for up to 24 months post vaccination with the modified live virus vaccine (McCollum 1986), as opposed to the 12 monthly interval recommended between boosters. The manufacturer recommends six-monthly boosters after a primary course of killed vaccine. However, after receiving several boosters of the killed vaccine, protective antibodies persist for longer periods (Newton 2007).

EVA vaccines are not recommended for use in pregnant mares due to the risk of abortions. In a recent study, vaccination with modified live virus vaccine of mares midterm in gestation did not result in deleterious effects for the foetus and results in colostrum that can provide passive protection against EVA for neonatal foals (Broaddus et al. 2011b). Vaccination of donor mares with modified live virus vaccine may also reduce the risk of embryo contamination when using EAV carrier semen (Broaddus et al. 2011a).

#### **4.4.3 Current biosecurity measures**

Australia's current biosecurity measures for EVA follow the recommendations in the Code. Current biosecurity measures require that all horses, including foals, are subject to premises of origin freedom declaration and pre-export isolation. Isolation, serological testing and/or vaccinations are required for fillies, mares and geldings. Isolation in quarantine, serological tests, virus isolation, vaccination and/or test mating are required for stallions.

#### **4.4.4 Risk review**

EVA is present in approved countries and Australia, where it is a nationally notifiable animal disease (DAFF 2011).

The current measures require testing, isolation and/or vaccination in accordance with Code recommendations, and further measures to manage detection of semen shedding stallions.

The reference to manufacturer's recommendations has been removed because vaccine protocols vary widely, resulting in issues with compliance in determining if a

particular schedule corresponds to the manufacturer's recommendations. The certifying Official Veterinarian will determine that the horse has an acceptable vaccination history.

#### 4.4.5 Conclusion

EVA is present in approved countries and in Australia where it is a nationally notifiable animal disease (DAFF 2011). Based on the preceding information and after consideration of Australia's status for EVA, risk management measures (for all horses excluding unweaned foals under six months of age) in accordance with the Code (OIE 2012c) will be included in Australia's biosecurity measures.

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## 5 Biosecurity measures for importation of horses

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The biosecurity measures described in Section 5.1 of this policy review apply to the importation of horses, donkeys and mules from approved countries. In this context, ‘horse’ refers to horses, donkeys and mules unless otherwise specified.

Unless otherwise detailed in Chapter 4 of this policy review, these measures remain unchanged from those adopted after the completion of the *Import risk analysis report for horses from approved countries: final report* (horse IRA). Pre-export facility requirements are outlined in a separate guideline document at Appendix B and are available on request from the Australian Government Department of Agriculture Fisheries and Forestry (DAFF).

Changes are included for the biosecurity measures for contagious equine metritis, equine influenza, equine piroplasmiasis and equine viral arteritis. The biosecurity measures for West Nile fever and horse pox have been removed.

The permanent importation of horses seropositive for equine piroplasmiasis is not permitted. Seropositive horses may be imported temporarily for competition purposes and biosecurity measures from *Animal Quarantine Policy Memorandum 1999/81* are recommended.

Specific measures will be developed for each approved country and will reflect that country’s animal health status.

An example of the biosecurity measures to be included in an import permit for a hypothetical approved country, Country X, is provided in Section 5.2. Residency periods and timing of testing remain in Section 5.1; however, the measures described for Country X in Section 5.2 are amended to take into account the logistics of preparation of horses for export, providing less trade restrictive options and facilitating certification without compromising biosecurity (e.g. timing of tests can be aligned in most instances ).

In 2011, the Horse Industry Consultative Committee (HICC) agreed to discontinue the use of biosecurity measures for the temporary importation of horses. This policy review is based on this position. Revision of this decision is outside the scope of this review and should be raised through HICC.

### 5.1 Biosecurity measures for the permanent importation of horses from approved countries

#### 5.1.1 Administrative conditions

Importation under these conditions is restricted to horses, donkeys and mules that were continuously resident and free of quarantine restriction in the exporting country for at least 60 days immediately before export to Australia. The 60 days residency requirement may be achieved in more than one approved country if specifically authorised by DAFF. Biosecurity measures for each country of residence must be addressed.

Permission to import must be obtained in writing from DAFF before the export of horses.

Other administrative conditions, including details of import permit requirements and transport arrangements, are available from DAFF. Contact details are:

Animal Import Operations

DAFF

GPO Box 858

Canberra ACT 2601

Phone +61 2 6272 4454

Fax +61 2 6272 3110

E-mail: [animalimports@daff.gov.au](mailto:animalimports@daff.gov.au)

The full conditions can also be viewed on DAFF's import conditions database (ICON) at [www.daff.gov.au](http://www.daff.gov.au).

### 5.1.2 Documentation

These biosecurity measures apply to horses, donkeys and mules. 'Horse' refers to horses, donkeys and mules unless otherwise specified.

Each horse, other than an unweaned foal less than six months of age travelling with its dam, must travel with an original international veterinary certificate that conforms to Article 5.10.2 of the World Organisation for Animal Health (OIE) Terrestrial Animal Health Code (the Code), signed by the Official Veterinarian\* of the country of export.

\* Official Veterinarian means a veterinarian authorised by the Veterinary Authority of the country of export to perform certain official tasks associated with animal health and/or public health, and inspections of commodities and, when appropriate, to certify in conformity with the provisions of Chapters 5.1 and 5.2 of the Code.

The veterinary certificate must:

- be written in English and a language understood by the Official Veterinarian of the country of export
- meet the requirements of the **certification before export** section, state that all **pre-export biosecurity measures** were met and that the approved pre-export quarantine facility complied with its approved standard operating procedures (SOPs)
- provide identification for each animal (passport details and/or microchip number/site or brand or silhouette) including description, species, sex and age
- include the name and address of the exporter and importer and identify the DAFF import permit number against which it was issued.

The Official Veterinarian must:

- provide a separate veterinary certificate for each horse, including foals over six months of age
- attach certification applicable to unweaned foals under six months of age to the veterinary certificate of the foal's dam
- attach all original documents, or endorsed copies, e.g. laboratory reports, that form part of the extended veterinary certificate
- sign, date and stamp each page of the veterinary certificate and supporting

documents with the stamp of the Veterinary Authority.

### **5.1.3 Pre-export biosecurity measures**

#### **Pre-export quarantine**

1. Horses must undergo pre-export quarantine in a facility approved by DAFF and the Veterinary Authority in the exporting country for that purpose.
2. DAFF and the Veterinary Authority in the exporting country's approval of pre-export quarantine facilities is based on their ability to meet biosecurity objectives, including adequate segregation of the horses, and to meet relevant operational requirements and animal welfare standards.
3. A list of approved facilities and the guidelines that DAFF uses to assess prospective pre-export quarantine facilities can be provided on request.
4. The Official Veterinarian must inspect the pre-export quarantine facility before commencement of pre-export quarantine and must ensure that the facility was cleaned to his/her satisfaction.
5. The pre-export quarantine facility must be under the supervision of the Official Veterinarian and must have current approval from DAFF and the Veterinary Authority of the exporting country before commencement of pre-export quarantine. The pre-export quarantine period commences from the time the last horse in the export consignment has entered the pre-export quarantine facility and all horses have been examined by the Official Veterinarian.
6. All pre-export quarantine operations and procedures must be detailed in SOPs, consistent with a risk-based approach and approved by DAFF. The Official Veterinarian must be familiar with the approved SOPs and must verify that the pre-export quarantine facility operates in accordance with these SOPs. In doing so, the Official Veterinarian should pay particular attention to the segregation of the horses undergoing pre-export quarantine from any other horses, the cleaning and decontamination of personnel and equipment that enters the facility, the entry of feed and bedding into the facility, and any other opportunities for pathogens to be introduced into the pre-export quarantine facility.
7. DAFF may inspect or audit the approved pre-export quarantine facility.
8. A detailed health record must be kept for each horse and be available to the Official Veterinarian and to DAFF on request.
9. Before the consignment of horses leaves the pre-export quarantine facility for export the importer must provide evidence to DAFF, in the form of a checklist, that veterinary certificates and health records were inspected and comply with the biosecurity measures. Information should be provided during working hours to ensure timely attention. Horses must not be loaded for export to Australia until confirmation is received from DAFF that up-load can proceed.
10. Any variation from the approved SOPs and other pre-export biosecurity measures must be specifically authorised by DAFF.

### **5.1.4 Certification before export**

The Official Veterinarian must certify:

1. During pre-export quarantine:
  - a. the horse was treated with a broad spectrum anthelmintic (date and treatment schedule stated on the veterinary certificate)
  - b. the horse was not vaccinated
  - c. the horse was not mated or subjected to reproductive manipulation, other than required for certification
  - d. all horses in the pre-export quarantine facility remained free from evidence of infectious or contagious disease, and had no contact with equids except those that meet all the conditions in these biosecurity measures
  - e. all samples for testing were taken by the Official Veterinarian or a veterinarian authorised by the Official Veterinarian
  - f. all testing was conducted in a laboratory recognised by the Veterinary Authority of the country of export.
2. The horse was examined by the Official Veterinarian within 24 hours before leaving the pre-export quarantine facility for the port of export and was found to be:
  - a. free from evidence of infectious or contagious disease
  - b. visibly free of external parasites
  - c. after due inquiry, in the case of a mare, either not pregnant or less than seven months pregnant
  - d. healthy and fit to travel.
3. Vehicles for transporting horses from the pre-export quarantine facility to the port of export were cleaned and disinfected to the satisfaction of the Official Veterinarian before entering the pre-export quarantine facility to load the horses.
4. The Official Veterinarian was present during loading of horses when leaving the pre-export quarantine facility to supervise sealing of vehicles for transporting horses, with tamper-evident seals.
5. All of the following risk management measures apply:

#### **African horse sickness**

- a. For 40 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of African horse sickness occurred during the previous two years before export and the disease is compulsorily

notifiable.

**AND**

- b. The horse was not vaccinated against African horse sickness during 40 days before export.

**Anthrax**

For 20 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of anthrax occurred in any species during the previous 20 days and the disease is compulsorily notifiable.

**Borna disease**

For 60 days immediately before export the horse did not reside on any premises in a defined area in the country of export where clinical evidence of Borna disease occurred in any species during the previous 90 days before export.

**Contagious equine metritis** (excludes donkeys and mules)

For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of contagious equine metritis occurred during the previous two years before export.

**OR**

For all horses excluding geldings and unweaned foals less than six months of age:

- a. For 60 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of contagious equine metritis occurred in horses during the previous 60 days before export.

**AND**

- b. The horse was never mated to, or inseminated with semen from, a horse that was, at the time of mating or semen collection, known to be infected with *Taylorella equigenitalis*.

NOTE: If a horse does not meet this requirement, or has been known to be infected with *T. equigenitalis*, it may be permitted entry subject to an approved method of treatment and testing considered appropriate by the Director of Quarantine (or delegate).

**AND**

- c. The horse was not treated with antibiotics for at least seven days before collection of the first samples for culture nor during the sample collection period.

**AND**

- d. The horse was not mated to or inseminated with semen from a horse after collection of the first samples for culture.

**AND**

- e. Samples were taken from the horse during pre-export quarantine and tested for *T. equigenitalis* by culture<sup>#</sup> with negative results in each case.

For colts and stallions separate samples from each of the urethra, the urethral fossa and sinus, and the penile sheath were collected on two occasions at least four days apart.

**OR**

For fillies and mares, one sample from the clitoral fossa, including the clitoral sinuses, was collected on two occasions at least four days apart.

<sup>#</sup>The swabs were transported to a laboratory in Amies charcoal medium, kept cool and the samples were set up for culture within 48 hours of collection. The culture must have been incubated for at least seven days before it can be certified negative for *T. equigenitalis*.

### **Dourine**

For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of dourine occurred during the previous two years before export and the disease is compulsorily notifiable.

### **Eastern and Western equine encephalomyelitides**

For 90 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of Eastern or Western equine encephalomyelitis occurred during the previous two years before export.

**OR**

For 90 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of Eastern or Western equine encephalomyelitis occurred during the previous 90 days before export.

**OR**

The horse was held in a pre-export quarantine facility for at least 21 days immediately before export. During this time the horse was isolated from animals not prepared in accordance with these biosecurity measures **and**

during pre-export quarantine the horse was stabled in insect-screened stables and was treated with an insect repellent for protection from biting insects before leaving the stables.

**OR**

During the 12 months before export, but not during pre-export quarantine, the horse was vaccinated against Eastern and Western equine encephalomyelitis using an approved vaccine according to the manufacturer's recommendations.

**Epizootic lymphangitis**

For 60 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of epizootic lymphangitis occurred during the previous 60 days before export.

**Equid herpesvirus-1 (abortigenic and neurological strains)**

For 21 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of equid herpesvirus-1 (abortigenic and neurological strains) occurred during the previous 21 days before export.

**Equine infectious anaemia**

- a. For 60 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of equine infectious anaemia occurred during the previous 90 days before export.

**AND**

- b. For all horses including unweaned foals less than six months of age:  
A blood sample was taken from the horse during pre-export quarantine and tested using an agar gel immunodiffusion test or enzyme-linked immunosorbent assay for equine infectious anaemia as described in the OIE Manual with negative results.

**Equine influenza**

For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of equine influenza occurred during the previous 12 months before export, vaccination against equine influenza is not practised, and the disease is compulsorily notifiable.

**OR**

For all horses including unweaned foals less than six months of age, except where otherwise specified:

- a. For 21 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of equine influenza occurred during the previous 30 days.

**AND**

- b. The horse (other than foals under six months of age) was vaccinated against equine influenza 14–90 days before commencement of pre-export quarantine with a complete primary course, the final of a primary course, or a booster to a

primary course, using a registered vaccine.

Vaccines containing the most up-to-date equine influenza vaccine virus strains available should be used.

**AND**

- c. The horse was held in pre-export quarantine in a facility approved by DAFF and the Veterinary Authority in the country of export for at least 14 days immediately before export. During this time the horse was isolated from equids not of equivalent equine influenza status.

**AND**

- d. Nasopharyngeal samples (nasal samples for foals under six months of age) were taken from the horse four to six days after commencement of pre-export quarantine and during the four days before leaving the pre-export quarantine facility and tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene with negative results in each case.

**AND**

- e. For the duration of pre-export quarantine the rectal temperature of the horse was taken and recorded twice daily at least eight hours apart. If the temperature was 38.5 °C or higher (39.0 °C or higher for foals under six months of age) on two consecutive recordings, or other signs of infectious respiratory disease were present, a nasopharyngeal sample (nasal sample for foals under six months of age) was taken and tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene and DAFF was notified within 48 hours. If the temperature was not taken for any reason on two consecutive occasions, DAFF was notified within 48 hours and a clinical examination by a registered veterinarian performed. Temperature records must be kept until completion of post-arrival quarantine.

**Requirements for pre-export quarantine include:**

1. The pre-export quarantine facility was approved by DAFF and the Veterinary Authority in the exporting country.
2. All personnel entering the pre-export quarantine facility during pre-export quarantine must shower and change clothing on entry. Alternatively, they may shower off-site and must have no contact with horses or horse facilities between showering and entering the pre-export quarantine facility. Outer clothing used in the pre-export quarantine facility should be freshly laundered or dedicated to the facility and stored on site or be disposable. Footwear used in the pre-export quarantine facility should be cleaned and disinfected before entry or dedicated to the facility and stored on site, or disposable covering should be used over existing footwear.
3. All equipment used in feeding, handling and treating the horse in pre-export quarantine must be new or cleaned and disinfected with a product effective against

equine influenza virus before use and must be used only in the pre-export quarantine facility for the duration of pre-export quarantine.

4. Horses in pre-export quarantine must not access any areas used by other horses unless specifically authorised by DAFF.
5. Vehicles for transporting horses from the pre-export quarantine facility to the place of export must be cleaned and disinfected with a product effective against equine influenza virus.

#### **Equine piroplasmosis**

Since birth the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of equine piroplasmosis occurred during the previous two years before export and the disease is compulsorily notifiable.

**OR**

For all horses including unweaned foals under six months of age:

- a. For 60 days immediately before export the horse did not reside on any premises where clinical, epidemiological or other evidence of equine piroplasmosis occurred during the previous 60 days before export.

**AND**

- b. The horse was not treated with imidocarb or other anti-babesial agents active against *Babesia caballi* or *Theileria equi*, during the 12 months before commencement of pre-export quarantine.

**AND**

- c. The horse was not positive in any test for equine piroplasmosis (*B. caballi* or *T. equi*) for at least 12 months before the commencement of pre-export quarantine, **or**

after consultation with DAFF, the horse was confirmed negative for equine piroplasmosis (*B. caballi* and *T. equi*) by an OIE reference laboratory using both an indirect fluorescent antibody test (IFAT) and competitive enzyme-linked immunosorbent assay (cELISA) as described in the OIE Manual on a single serum sample.

**AND**

- d. The horse was held in pre-export quarantine for at least 14 days immediately before export. During this time the horse was isolated from animals not of equivalent piroplasmosis status.

**AND**

- e. During pre-export quarantine there was no opportunity for iatrogenic transmission.

**AND**

- f. Within 24 hours after commencement of pre-export quarantine the horse was thoroughly examined for ticks under the direct supervision of an Official Veterinarian. A systematic approach was undertaken and the entire horse was examined, with particular attention to the ears, false nostrils, under-body areas (axilla, inguinal region and under the jawbone), perineum, mane and tail.

**AND**

- g. Within 24 hours after commencement of pre-export quarantine the horse was treated, under the direct supervision of the Official Veterinarian, with a parasiticide effective against ticks (date and treatment schedule stated on the veterinary certificate).

**AND**

- h. If any horse in the pre-export quarantine facility was found to have ticks at commencement or during pre-export quarantine, the ticks were removed and all horses in the facility were treated within 24 hours and again seven days later with a parasiticide effective against ticks (date and treatment schedule stated on the veterinary certificate).

**AND**

- i. The horse was tested for both *B. caballi* and *T. equi* using both an IFAT and cELISA as described in the OIE Manual on a single blood sample, which was taken at least four days after commencement of pre-export quarantine, with negative results for all tests, **or**

after consultation with DAFF, the horse was confirmed negative for equine piroplasmiasis (*B. caballi* and *T. equi*) by an OIE reference laboratory using both an IFAT and cELISA as described in the OIE Manual on a single serum sample which was taken at least four days after commencement of pre-export quarantine.

NOTE: If there is no recognised laboratory in the country of export, testing in another country must be conducted in a laboratory recognised by the Veterinary Authority of the country of export.

**Equine viral arteritis**

For 28 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of equine viral arteritis occurred during the previous 28 days before export.

**AND**

For all horses excluding unweaned foals under six months of age:

**For colts or stallions:**

A single blood sample was taken from the horse at least seven days after commencement of pre-export quarantine and tested using a virus neutralisation test for equine viral arteritis as described in the OIE Manual with negative results.

**OR**

The horse was subjected between six and nine months of age to a virus neutralisation test for equine viral arteritis as described in the OIE Manual with **either**

- a. a negative result, **or**
- b. with a positive result, carried out on two blood samples collected at least 14 days apart with a stable or decreasing titre

**and** was then vaccinated against equine viral arteritis within 24 hours of receiving the negative/second test result and regularly revaccinated.

**OR**

The horse was isolated and not earlier than seven days of commencing isolation was subjected to a virus neutralisation test for equine viral arteritis as described in the OIE Manual on a blood sample with negative results and was then vaccinated within 24 hours of receiving the negative test result and was kept separated from other equids for 21 days following vaccination and was regularly revaccinated.

**OR**

The horse was subjected to a virus neutralisation test for equine viral arteritis, as described in the OIE Manual, carried out on a single blood sample with positive results and then **either**

- a. was subsequently test mated to two mares within 180 days immediately before export which were subjected to two virus neutralisation tests for equine viral arteritis as described in the OIE Manual with negative results on blood samples collected at the time of test mating and again 28 days after the mating **or**
- b. was subjected to a virus isolation test for equine arteritis virus as described in the OIE Manual with negative results, carried out on semen collected during the 180 days immediately before export **or**
- c. was subjected to a virus isolation test for equine arteritis virus as described in the OIE Manual with negative results, carried out on semen collected within 180 days after the blood sample was tested, then vaccinated within 24 hours of receiving the negative test result and regularly revaccinated.

For fillies, mares and geldings:

The horse was subjected to a virus neutralisation test for equine viral arteritis, as described in the OIE Manual, carried out on blood samples collected either once within 21 days before export with a negative result, or on two occasions at least 14 days apart within 28 days before export, which demonstrated stable or declining antibody titres.

**OR**

The horse was regularly vaccinated.

**OR**

The horse was isolated for the 28 days immediately before export and during this period the isolated horses showed no signs of equine viral arteritis.

**Glanders**

For 180 days immediately before export, or since birth if under six months of age, the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of glanders occurred during the previous three years before export and the disease is compulsorily notifiable.

**Japanese encephalitis**

For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of Japanese encephalitis occurred during the previous 12 months before export.

**OR**

The horse was held in pre-export quarantine for at least 21 days immediately before export. During this time the horse was isolated from animals not of equivalent Japanese encephalitis status **and**

during pre-export quarantine the horse was stabled in insect-screened stables. The horse was treated with an insect repellent for protection from biting insects before leaving the stables.

**OR**

Within 12 months before export, but not during pre-export quarantine, the horse was vaccinated against Japanese encephalitis using an approved vaccine according to the manufacturer's recommendations.

**Lyme disease**

For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of Lyme disease occurred during the previous two years before export.

**OR**

For all horses including unweaned foals less than six months of age:

- a. For 60 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of Lyme disease occurred in any species during the previous 90 days before export.

**AND**

- b. The horse was held in pre-export quarantine for at least 14 days immediately before export. During this time the horse was isolated from animals not of equivalent Lyme disease status.

**AND**

- c. Within 24 hours after commencement of pre-export quarantine the horse was thoroughly examined for ticks under the direct supervision of an Official Veterinarian. A systematic approach was undertaken and the entire horse was examined, with particular attention to the ears, false nostrils, under-body areas (axilla, inguinal region and under the jawbone), perineum, mane and tail.

**AND**

- d. Within 24 hours after commencement of pre-export quarantine the horse was treated, under the direct supervision of the Official Veterinarian, with a parasiticide effective against ticks (date and treatment schedule stated on the veterinary certificate).

**AND**

- e. If any animal in the pre-export quarantine facility was found to have ticks at commencement of, or during pre-export quarantine, the ticks were removed and all horses in the facility were treated within 24 hours and again seven days later with a parasiticide effective against ticks (date and treatment schedule stated on the veterinary certificate).

### **Rabies**

For 180 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of rabies occurred during the previous two years before export and the disease is compulsorily notifiable.

**OR**

For 180 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of rabies occurred in any species during the previous 12 months before export and the disease is compulsorily notifiable.

### **Screw-worm-fly myiasis**

For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of screw-worm-fly (*Cochliomyia hominivorax* or *Chrysomya bezziana*) myiasis occurred during the previous 12 months before export.

**OR**

For all horses including unweaned foals under six months of age:

- a. For 60 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of screw-worm-fly myiasis occurred in any species during the previous 90 days before export.

**AND**

- b. On arrival at the pre-export quarantine facility, the horse was thoroughly examined, under the direct supervision of the Official Veterinarian, and no screw-worm-fly infestation was found.

**AND**

- c. Within 24 hours of export the horse was thoroughly examined, under the direct supervision of the Official Veterinarian, and no screw-worm-fly infestation was found.

**Surra**

For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of surra occurred in any species during the previous 12 months before export.

**OR**

For all horses including unweaned foals under six months of age:

- a. For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of surra occurred in equids during the previous 12 months before export.

**AND**

- b. For 60 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of surra occurred during the previous 12 months before export.

**AND**

- c. The horse was held in pre-export quarantine for at least 21 days immediately before export.

**AND**

- d. The pre-export quarantine facility was located in a defined area where no clinical, epidemiological or other evidence of surra occurred in equids for 12 months before export.

**AND**

- e. During pre-export quarantine the horse was isolated and not held, housed or exercised within 200 metres of ruminants or camelids, or equids not of equivalent surra status.

**AND**

- f. During pre-export quarantine the horse was stabled in insect-screened stables. The horse was treated with an insect repellent for protection from biting flies before leaving the stables.

**AND**

- g. Blood samples were taken from the horse at least 10 days after commencement of pre-export quarantine and tested using an antibody-detection enzyme-linked immunosorbent assay and microhaematocrit centrifugation technique as described in the OIE Manual for surra (*Trypanosoma evansi*) with negative results in each case.

**AND**

- h. The horse was treated with an insect repellent for protection from biting flies before leaving the stable and being loaded into the vehicle for transporting horses from the pre-export quarantine facility to the port of export, and after loading insecticide was applied inside the vehicle.

**Venezuelan equine encephalomyelitis**

- a. For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of Venezuelan equine encephalomyelitis occurred during the previous two years before export and the disease is compulsorily notifiable.

**AND**

- b. The horse was not vaccinated against Venezuelan equine encephalomyelitis during the 60 days before export.

**Vesicular stomatitis**

For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in a country where no clinical, epidemiological or other evidence of vesicular stomatitis occurred in any species during the previous two years before export and the disease is compulsorily notifiable.

**OR**

- a. For 30 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of vesicular stomatitis occurred in any species during the previous 90 days before export and the disease is compulsorily notifiable.

**AND**

- b. The horse was held in pre-export quarantine for at least 14 days immediately before export. During this time the horse was isolated from equids and domestic livestock not of equivalent vesicular stomatitis status.

**AND**

- c. The pre-export quarantine facility was located in a defined area where no clinical, epidemiological or other evidence of vesicular stomatitis occurred in any species for 90 days before export.

**AND**

- d. A blood sample was taken from the horse at least eight days after commencement of pre-export quarantine and tested using an enzyme-linked immunosorbent assay or virus neutralisation test as described in the OIE Manual for vesicular stomatitis (both Indiana and New Jersey strains) with negative results.

### **5.1.5 Certification at port of export**

At the port of export, a government official must certify that:

1. During transport to the port of export, the horse had no contact with horses except those that meet all the conditions in these biosecurity measures.
2. The compartment of the aircraft or vessel to be occupied by the horse and all removable equipment, penning and containers including loading ramps were satisfactorily cleaned and disinfected before loading.

### **5.1.6 Transport**

1. Exporters or their agents must have detailed SOPs consistent with a risk-based approach and approved by DAFF, to cover procedures including contingency plans, for transporting the horse from pre-export quarantine until arrival in Australia.
2. The transport route from the pre-export quarantine facility to the approved airport must be approved by the Official Veterinarian.
3. The Official Veterinarian must be present during loading of horses when leaving the pre-export quarantine facility to ensure vehicles for transporting horses are adequately cleaned and disinfected before loading, to supervise sealing of vehicles for transporting horses with tamper-evident seals and to certify that the horses are fit to travel. A government officer authorised by the Veterinary Authority must be available at the airport to check the vehicle seals are intact on arrival and ensure ramps and air stalls are adequately cleaned and disinfected.
4. All personnel likely to be in direct contact with the horses during transport to Australia (including transport from the pre-export quarantine facility to the airport, at the airport, and on the aircraft) must shower and wear new or clean protective clothing and footwear before coming into contact with the horses. They must not have any contact with horses except those that meet all the conditions in these biosecurity measures during transport to Australia.
5. All feed to be used during transport to Australia must enter the pre-export quarantine facility before commencement of pre-export quarantine.
6. The use of hay or straw as bedding during transport is not permitted. Treated wood shavings, sterilised peat and soft board can be used.
7. Horses must remain isolated from all animals except those that meet all the conditions described in these biosecurity measures during transport from the pre-

export quarantine facility until arrival in Australia.

8. Insect netting must be carried on the flight at all times for contingencies. There must be sufficient insect netting to cover all air stalls completely. Insect netting must be in good condition to minimise entry of insect vectors into the air stalls.
9. An Australian government veterinarian may be required to accompany the shipment to Australia at the importer's expense.
10. The consignment may be accompanied by horses that meet all the conditions described in these biosecurity measures or animals of other species only with the prior written approval of DAFF. The consignment may not be accompanied by horses that do not meet all the conditions described in these biosecurity measures.
11. The design of the air stalls, the recommended requirements for horses, the preparation for transport, and the disinfection of the interior of the aircraft, removable equipment, penning and containers must be in accordance with the recommendations of the Code and International Air Transport Association Live Animal Regulations unless otherwise agreed by DAFF.

### **Transit and transhipment**

1. Horses must transit or tranship only at an approved airport. Any transhipment requires the prior approval of DAFF. Stops en route to Australia will need approval and permits from relevant authorities in the countries of transit and transhipment. Transit and transhipment times must not exceed six hours. Horses are not to leave the airport and must not be removed from their air stalls during transit or transhipment.
2. Horses must remain on board the aircraft at approved transit airports. Unauthorised personnel must not have contact with the horses. Cargo doors can be opened at approved transit airports to allow for unloading or loading of freight. Immediately after the cargo hold doors are closed, an approved knockdown aerosol insecticide must be sprayed throughout the cargo hold, in the manner recommended by the manufacturer.
3. In cases where horses in air stalls are to be unloaded, before opening the cargo door, the air stalls must be completely covered in netting to prevent insect access to the horses. The netting must remain in place until the horses are reloaded on an aircraft. Immediately after the horses are reloaded on an aircraft and the cargo hold doors are closed, an approved knockdown aerosol insecticide spray must be sprayed throughout the cargo hold in the manner recommended by the manufacturer. The insect netting must not be removed until 30 minutes after spraying.

### **Delayed takeoffs and unscheduled landings**

1. Exporters or their agents must have contingency plans for the management of delayed takeoffs and unscheduled landings.
2. If unloading or any other transit/transhipment activities occur in a way that conflicts with these conditions, or if the aircraft makes an unscheduled landing,

DAFF must be notified as soon as possible and before arrival in Australia. Additional biosecurity measures may be required, and DAFF will assess this on a case-by-case basis after considering the risks.

### **Arrival in Australia**

1. Importers or their agents must have detailed SOPs consistent with a risk-based approach and approved by DAFF, to cover post-arrival procedures. These SOPs are to be developed in consultation with DAFF and must include roles and responsibilities for their staff, including grooms, cleaning and disinfection of air stalls, the area used to transfer horses to road transport at the airport, vehicles for transporting horses at the post-arrival quarantine facility, and road transport arrangements including contingency plans for vehicle and equipment failures.
2. After the horses arrive at an Australian airport they must be transferred from their air stalls onto vehicles for transporting horses, along with personnel and equipment, and proceed directly to the post-arrival quarantine facility. DAFF door seals must be applied to vehicles for transporting horses to maintain biosecurity integrity during transport to the post-arrival quarantine facility.
3. All personnel travelling with the horses on the aircraft and road transport, or that have had contact with the horses, biosecurity risk material or air stalls, must undertake appropriate decontamination measures as specified by DAFF before leaving the airport or the post-arrival quarantine facility if they are accompanying the horses to the post-arrival quarantine facility.
4. Feed and water used during transport can travel with the horses to the post-arrival quarantine facility for use only during post-arrival quarantine.
5. All biosecurity risk material (e.g. bedding, feed, water and waste material) remaining at the airport must be sealed in bags, ordered into quarantine and disposed of under DAFF supervision.
6. Air stalls must be secured at the airport in a manner that prevents release of biosecurity risk material and cleaned and disinfected in a manner approved by DAFF.
7. Vehicles for transporting horses from the port of entry to the post-arrival quarantine facility must be cleaned and disinfected to the satisfaction of the DAFF officer before loading the horses. DAFF must be advised of the transport route to the post-arrival quarantine facility.
8. Unless accompanying horses to the post-arrival quarantine facility, all equipment used during transport of the horses, and all baggage and personal equipment accompanying personnel, must be cleaned and disinfected under DAFF supervision before leaving the airport.

## 5.1.7 Post-arrival biosecurity measures

### Post-arrival quarantine

Any variation from the post-arrival biosecurity measures must be specifically authorised by DAFF.

DAFF may require additional testing to confirm or rule out suspicion of disease.

All of the following risk management measures apply:

#### Equine influenza

- a. For horses originating from a single pre-export quarantine facility:

The horse must be held in post-arrival quarantine for at least 14 days. During this time the horse must be isolated from equids not of equivalent equine influenza status **and**

nasopharyngeal samples (nasal samples for foals under six months of age) must be taken from the horse four to six days after commencement of post-arrival quarantine and within four days of release from post-arrival quarantine **and**

tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene with negative results in each case.

**OR**

For horses originating from multiple pre-export quarantine facilities:

The horse must be held in post-arrival quarantine for at least 14 days. During this time the horse must be isolated from equids not of equivalent equine influenza status **and**

the period of intake of consignments into the post-arrival quarantine facility should be kept to a minimum. The post-arrival quarantine period will commence from the time of entry into the facility of the last horse of the post-arrival quarantine intake **and**

nasopharyngeal samples (nasal samples for foals under six months of age) must be taken from the horse within 24 hours of arrival into the post-arrival quarantine facility and four to six days after commencement of post-arrival quarantine and within four days of release from post-arrival quarantine and tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene negative results in each case.

**AND**

- b. For the duration of post-arrival quarantine, the horse must not be held, housed or exercised within 100 metres of other equids not of equivalent equine influenza status.

**AND**

- c. A reference serum sample must be taken from the horse within 24 hours of

arrival into the post-arrival quarantine facility and stored at the National Animal Serum Bank at the Australian Animal Health Laboratory.

**AND**

- d. For the duration of post-arrival quarantine the rectal temperature of the horse must be taken and recorded twice daily at least eight hours apart. If the temperature is 38.5 °C or higher (39.0 °C or higher for foals under six months of age) on two consecutive recordings or other signs of infectious respiratory disease are present, a nasopharyngeal sample (nasal for foals under six months of age) must be taken and tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene and DAFF notified on the same day. If the temperature cannot be taken for any reason on two consecutive occasions, DAFF must be notified on the same day and a clinical examination by a registered veterinarian performed. Temperature records must be made available for inspection by DAFF.

**Requirements for post-arrival quarantine include:**

1. The post-arrival quarantine facility must provide a separation of at least 100 metres from other equids not of equivalent equine influenza status.
2. All personnel entering the post-arrival quarantine facility during post-arrival quarantine must wear dedicated or disposable outer clothing and dedicated, cleaned and disinfected or disposable footwear. All personnel must shower and change outer clothing before leaving the post-arrival quarantine facility. Outer clothing and footwear used within the post-arrival quarantine facility must be cleaned to the satisfaction of DAFF before removal from the facility.
3. All equipment used in feeding, handling and treating the horse in post-arrival quarantine must either be cleaned and disinfected with a product effective against equine influenza virus to the satisfaction of DAFF before removal from the post-arrival quarantine facility, or remain on-site for the duration of post-arrival quarantine and then be released with DAFF approval at the completion of post-arrival quarantine.
4. Vehicles for transporting horses are not permitted to leave the post-arrival quarantine facility until thoroughly cleaned and disinfected to the satisfaction of the DAFF officer.

NOTE: A single consignment can be split between post-arrival quarantine facilities on arrival in Australia. If consignments are split, the status of one portion of the consignment may affect the status of the other portion. If the release from post-arrival quarantine of one portion is delayed for biosecurity reasons, the release of the other portion in a separate post-arrival quarantine facility may also be delayed.

**Equine piroplasmosis**

- a. Within 24 hours of arrival at the post-arrival quarantine facility, the horse must be thoroughly examined for ticks by a registered veterinarian under the direct supervision of the DAFF veterinarian. A systematic approach must be undertaken with close examination of ears, false nostrils, under-body areas (axilla, inguinal region and under the jawbone), perineum, mane and tail.

**AND**

- b. If any horse in the post-arrival quarantine facility is found to have ticks, the ticks must be removed and all horses in the facility must be treated within 24 hours, under the direct supervision of the DAFF veterinarian, with a parasiticide effective against ticks and that horse and must be tested for both *Babesia caballi* and *Theileria equi* on a single blood sample obtained at least 11 days after treatment for ticks.

**Lyme disease**

- a. Within 24 hours of arrival at the post-arrival quarantine facility the horse must be thoroughly examined for ticks by a registered veterinarian under the direct supervision of the DAFF veterinarian. A systematic approach must be undertaken with close examination of ears, false nostrils, under-body areas (axilla, inguinal region and under the jawbone), perineum, mane and tail.

**AND**

- b. If any horse in the post-arrival quarantine facility is found to have ticks, the ticks must be removed and all horses in the facility must be treated within 24 hours, under the direct supervision of the DAFF veterinarian, with a parasiticide effective against ticks.

**Surra**

- a. The horse must be held in post-arrival quarantine for at least 14 days.

**AND**

- b. Stables at the post-arrival quarantine facility must have been sprayed with a residual insecticide (e.g. synthetic pyrethroid) during the 24 hours before the horse arrives at the facility. For the duration of post-arrival quarantine the horse must be treated with insect repellent according to manufacturer's recommendations for protection from biting flies.

**Location**

1. The post-arrival quarantine facility should be close to the port of arrival and be conveniently located for supervision by the DAFF veterinarian.
2. The facility must be located in an area that has been free from equine infectious anaemia during the previous 12 months.
3. The facility must not be located in an area supporting high populations of horses.

**Facilities**

1. The post-arrival quarantine facility must be surrounded by two secure stock-proof fences at least five metres apart, or a physical barrier providing equivalent security

to prevent horses in post-arrival quarantine having contact with people or animals outside the facility.

2. The post-arrival quarantine facility including stables, yards, fences, feeding and watering arrangements must address animal welfare considerations.
3. Stables in the post-arrival quarantine facility must be constructed so that they can be cleaned and disinfected.
4. The post-arrival quarantine facility must provide a separation of at least 100 metres from equids outside the facility.
5. The post-arrival quarantine facility must have a separate area for the cleaning and disinfection of vehicles for transporting horses, and facilities for the safe unloading and loading of horses.
6. The post-arrival quarantine facility must have facilities for veterinary examination and the collection of samples.

### **Operation**

1. The post-arrival quarantine facility must be approved by DAFF before entry of any horse into the facility.
2. DAFF may audit the approved post-arrival quarantine facility.
3. All post-arrival quarantine operations and procedures must have detailed SOPs, consistent with a risk-based approach and approved by DAFF.
4. The process from the time horses arrive at the airport to the completion of post-arrival quarantine must be auditable.
5. Post-arrival quarantine must be under the supervision of the DAFF veterinarian.
6. The DAFF veterinarian must inspect the post-arrival quarantine facility before entry of any horse and must ensure that the facility is cleaned to his/her satisfaction.
7. The post-arrival quarantine period will commence from the time of entry into the facility of the last horse of the post-arrival quarantine intake.
8. During post-arrival quarantine, the only horses in the facility must be those of the import consignment.
9. For the duration of post-arrival quarantine the horse must not be held, housed or exercised within 100 metres of equids outside the facility.
10. Horses must not have the opportunity to mate while in post-arrival quarantine.
11. Appropriate biosecurity procedures must be implemented for vehicles for transporting horses, freight containers, equipment and associated personnel, including transport operators, before, during and after the transport of horses to the post-arrival quarantine facility.

12. Vehicles for transporting horses are not permitted to leave the post-arrival quarantine facility until thoroughly cleaned and disinfected to the satisfaction of the DAFF officer.
13. Each imported horse must be identified on arrival at the post-arrival quarantine facility and the accompanying veterinary certificate and passport examined and checked by DAFF.
14. Only personnel specifically authorised by DAFF are permitted to enter the post-arrival quarantine facility. Details of all visitor entries must be recorded.
15. All personnel entering the post-arrival quarantine facility during post-arrival quarantine must wear dedicated or disposable outer clothing and dedicated, cleaned and disinfected or disposable footwear. All personnel must shower and change outer clothing before leaving the post-arrival quarantine facility. Outer clothing and footwear used within the post-arrival quarantine facility must be cleaned to the satisfaction of DAFF before removal from the facility.
16. All equipment used in feeding, handling and treating horses in post-arrival quarantine must either be cleaned and disinfected to the satisfaction of DAFF before removal from the post-arrival quarantine facility, or remain on-site for the duration of post-arrival quarantine and then be released with DAFF approval at the completion of post-arrival quarantine.
17. Other than inspections, visits and treatments required for certification, all veterinary visits, health problems, tests, test results and treatments must be reported to the DAFF veterinarian within 24 hours.
18. Any health problems affecting other animals on the facility undergoing post-arrival quarantine must be reported to the DAFF veterinarian within 24 hours.
19. A detailed health record must be kept for each horse on the facility during the post-arrival quarantine period and it must be available to the DAFF veterinarian.
20. The DAFF veterinarian must document that veterinary certificates and health records were inspected and comply with the biosecurity measures.
21. Horses must not leave the facility during post-arrival quarantine.

## 5.2 Biosecurity measures for the permanent importation of horses from Country X

The following is an example of an extract from an import permit provided for a hypothetical approved country, Country X. This would be used as a basis for preparation of documentation for certification of horses, donkeys and mules for export from Country X to Australia.

### 5.2.1 Documentation

These biosecurity measures apply to horses, donkeys and mules. 'Horse' refers to horses, donkeys and mules unless otherwise specified.

Each horse, other than an unweaned foal less than six months of age travelling with its dam, must travel with an original international veterinary certificate that conforms to Article 5.10.2 of the World Organisation for Animal Health (OIE) Terrestrial Animal Health Code (the Code), signed by the Official Veterinarian\* of the country of export.

\*Official Veterinarian means a veterinarian authorised by the Veterinary Authority of the country of export to perform certain official tasks associated with animal health and/or public health, and inspections of commodities and, when appropriate, to certify in conformity with the provisions of Chapters 5.1 and 5.2 of the Code.

The veterinary certificate must:

- be written in English and a language understood by the Official Veterinarian of the country of export
- meet the requirements of the **certification before export** section and state that all **pre-export biosecurity measures** were met and that the approved pre-export quarantine facility complied with its approved standard operating procedures
- provide identification for each animal (passport details and/or microchip number/site or brand or silhouette) including description, species, sex and age
- include the name and address of the exporter and importer and identify the DAFF import permit number against which it was issued.

The Official Veterinarian must:

- provide a separate veterinary certificate for each horse, including foals over six months of age
- attach certification applicable to unweaned foals under six months of age to the veterinary certificate of the foal's dam
- attach all original documents, or endorsed copies, e.g. laboratory reports, that form part of the extended veterinary certificate
- sign, date and stamp each page of the veterinary certificate and supporting documents with the stamp of the Veterinary Authority.

## **5.2.2 Pre-export biosecurity measures**

### **Facilities**

1. Horses must undergo pre-export quarantine in a facility approved by DAFF and the Veterinary Authority in the country of export for that purpose.
2. DAFF and the Veterinary Authority in the exporting country's approval of pre-export quarantine facilities is based on their ability to meet biosecurity objectives, including adequate segregation of the horses, and to meet relevant operational requirements and animal welfare standards.
3. A list of approved facilities and the guidelines that DAFF uses to assess prospective pre-export quarantine facilities can be provided on request.
4. The pre-export quarantine facility must be located in a defined area where no clinical, epidemiological or other evidence of vesicular stomatitis occurred in any species for 90 days before export.

### **Operation**

1. The pre-export quarantine facility must be under the supervision of the Official Veterinarian and must have current approval from DAFF and the Veterinary Authority of the exporting country before commencement of pre-export quarantine.
2. DAFF may inspect or audit the approved pre-export quarantine facility.
3. The Official Veterinarian must inspect the pre-export quarantine facility before commencement of pre-export quarantine and must ensure that the facility has been cleaned and disinfectant applied to his/her satisfaction.
4. The pre-export quarantine period commences from the time the last horse in the export consignment has entered the pre-export quarantine facility and all horses have been examined by the Official Veterinarian.
5. All pre-export quarantine operations and procedures must be detailed in standard operating procedures (SOPs), consistent with a risk-based approach and approved by DAFF.
6. A detailed health record must be kept for each horse and be available to the Official Veterinarian and to DAFF on request.
7. Before the consignment of horses leaves the pre-export quarantine facility for export the importer must provide evidence to DAFF, in the form of a checklist, that veterinary certificates and health records have been inspected and comply with the biosecurity measures. Information should be provided during working hours to ensure timely attention. Horses must not be loaded for export to Australia until confirmation is received from DAFF that up-load can proceed.
8. Any variation from the approved SOPs and other pre-export biosecurity measures must be specifically authorised by DAFF.

### **5.2.3 Certification before export**

The Official Veterinarian must certify:

NOTE: If the Official Veterinarian of the country from which the horse is to be exported cannot certify for other countries in which the horse resided in the previous 60 days, an Official Veterinarian from each of those countries must also provide certification in an attached Appendix.

1. During pre-export quarantine:
  - a. the horse was treated with a broad spectrum anthelmintic (date and treatment schedule stated on the veterinary certificate)
  - b. the horse was not vaccinated
  - c. the horse was not mated or subjected to reproductive manipulation, other than required for certification
  - d. all horses in the pre-export quarantine facility remained free from evidence of infectious or contagious disease, and had no contact with equids except those that meet all the conditions described in this import permit.
  - e. all samples for testing were taken by the Official Veterinarian or a veterinarian authorised by the Official Veterinarian
  - f. all testing was conducted in a laboratory recognised by the Veterinary Authority of the country of export.
2. The horse was examined by the Official Veterinarian within 24 hours before leaving the pre-export quarantine facility for the port of export and was found to be:
  - a. free from evidence of infectious or contagious disease
  - b. visibly free of external parasites
  - c. after due inquiry, in the case of a mare, either not pregnant or less than seven months pregnant
  - d. healthy and fit to travel.
3. Vehicles for transporting horses from the pre-export quarantine facility to the port of export were cleaned and disinfected to the satisfaction of the Official Veterinarian before entering the pre-export quarantine facility to load the horses.
4. The Official Veterinarian was present during loading of horses when leaving the pre-export quarantine facility to supervise sealing of vehicles for transporting horses, with tamper-evident seals.
5. After due inquiry, for 180 days immediately before export, or since birth if under six months of age, the horse was continuously resident and free of quarantine restriction in Country X, or other countries, where no clinical, epidemiological or other evidence of glanders occurred during the previous three years before export

and the disease is compulsorily notifiable.

6. For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in Country X where no clinical, epidemiological or other evidence of African horse sickness, dourine, rabies or Venezuelan equine encephalomyelitis occurred during the previous two years before export and the diseases are compulsorily notifiable. The horse was not vaccinated against African horse sickness or Venezuelan equine encephalomyelitis during the 60 days before export.
7. For 60 days immediately before export the horse was continuously resident and free of quarantine restriction in Country X where no clinical, epidemiological or other evidence of Japanese encephalitis, screw-worm-fly (*Cochliomyia hominivorax* or *Chrysomya bezziana*) myiasis or surra occurred during the previous 12 months before export.
8. After due inquiry, for 60 days immediately before export the horse did not reside on any premises in Country X where clinical evidence of Borna disease occurred during the previous 90 days before export.
9. After due inquiry, for 60 days immediately before export the horse did not reside on any premises in Country X where clinical, epidemiological or other evidence of contagious equine metritis, epizootic lymphangitis, equine infectious anaemia, equine piroplasmiasis or Lyme disease occurred during the previous 60 days before export.
10. After due inquiry, for 30 days immediately before export the horse did not reside on any premises in Country X where clinical, epidemiological or other evidence of anthrax, equine herpesvirus-1 (abortigenic and neurological strains), equine influenza or equine viral arteritis occurred during the previous 30 days before export.
11. For 30 days immediately before export the horse did not reside on any premises in Country X where clinical, epidemiological or other evidence of vesicular stomatitis occurred in any species during the previous 90 days before export and the disease is compulsorily notifiable.
12. The horse was held in pre-export quarantine for at least 14 days immediately before export in a facility that met the requirements specified in the pre-export biosecurity measures. During this time the horse was isolated from domestic livestock except those that meet all the conditions described in this import permit.
13. Contagious equine metritis (excludes donkeys and mules)

For all horses excluding geldings and unweaned foals less than six months of age:

- a. After due inquiry, the horse was never mated to, or inseminated with semen from, a horse that was, at the time of mating or semen collection, known to be infected with *Taylorella equigenitalis*.

NOTE: If a horse does not meet this requirement, or has been known to be infected with *T. equigenitalis*, it may be permitted entry subject to an approved

method of treatment and testing considered appropriate by the Director of Quarantine (or delegate).

**AND**

- b. The horse was not treated with antibiotics for at least seven days before collection of the first samples for culture nor during the sample collection period

**AND**

- c. The horse was not mated to or inseminated with semen from a horse after collection of the first samples for culture

**AND**

- d. Samples were taken from the horse during pre-export quarantine and tested for *T. equigenitalis* by culture<sup>#</sup> with negative results in each case.

For colts and stallions separate samples from each of the urethra, the urethral fossa and sinus, and the penile sheath were collected on two occasions at least four days apart.

**OR**

For fillies and mares, one sample from the clitoral fossa, including the clitoral sinuses, was collected on two occasions at least four days apart.

<sup>#</sup>The swabs were transported to a laboratory in Amies charcoal medium, kept cool and the samples were set up for culture within 48 hours of collection. The culture must have been incubated for at least seven days before it can be certified negative for *T. equigenitalis*.

#### 14. Eastern and Western equine encephalomyelitis

For 90 days immediately before export the horse did not reside on any premises in the country of export where clinical, epidemiological or other evidence of Eastern or Western equine encephalomyelitis occurred during the previous 90 days before export.

**OR**

The horse was held in a pre-export quarantine facility for at least 21 days immediately before export. During this time the horse has been isolated from animals other than those prepared in accordance with the biosecurity measures described in this import permit **and**

during pre-export quarantine the horse was stabled in insect-screened stables and was treated with an insect repellent for protection from biting insects before leaving the stables.

**OR**

During the 12 months before export, but not during pre-export quarantine, the horse was vaccinated against Eastern and Western equine encephalomyelitis using an approved vaccine according to the manufacturer's recommendations.

15. Equine infectious anaemia

For all horses including unweaned foals less than six months of age:

A blood sample was taken from the horse during pre-export quarantine and tested using an agar gel immunodiffusion test or enzyme-linked immunosorbent assay for equine infectious anaemia as described in the OIE Manual with negative results.

16. Equine influenza

For all horses including unweaned foals less than six months of age, except where otherwise specified:

- a. The horse (other than foals under six months of age) was vaccinated against equine influenza 14–90 days before commencement of pre-export quarantine with a complete primary course, the final of a primary course, or a booster to a primary course, using a registered vaccine.

NOTE: Vaccines containing the most up-to-date equine influenza vaccine virus strains available should be used.

**AND**

- b. Nasopharyngeal samples (nasal samples for foals under six months of age) were taken from the horse four to six days after commencement of pre-export quarantine and during the four days before export and tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene with negative results in each case.

17. Equine piroplasmosis

For all horses including unweaned foals under six months of age:

- a. After due inquiry, the horse was not treated with imidocarb or other anti-babesial agents active against *Babesia caballi* or *Theileria equi*, during the 12 months before commencement of pre-export quarantine.

**AND**

- b. After due inquiry, the horse was not positive in any test for equine piroplasmosis (*B. caballi* or *T. equi*) for at least 12 months before the commencement of pre-export quarantine **or**  
after consultation with DAFF, the horse was confirmed negative for equine piroplasmosis (*B. caballi* and *T. equi*) by an OIE reference laboratory using both an indirect fluorescent antibody test (IFAT) and competitive enzyme-linked immunosorbent assay (cELISA) as described in the OIE Manual on a single serum sample.

**AND**

- c. During pre-export quarantine there was no opportunity for iatrogenic

transmission.

**AND**

- d. The horse was tested for both *B. caballi* and *T. equi* using both an IFAT and cELISA as described in the OIE Manual on a single blood sample, which was taken at least four days after commencement of pre-export quarantine, and with negative results for all tests **or**

after consultation with DAFF, the horse was confirmed negative for equine piroplasmiasis (*B. caballi* and *T. equi*) by an OIE reference laboratory using both an IFAT and cELISA as described in the OIE Manual on a single serum sample which was taken at least four days after commencement of pre-export quarantine.

NOTE: If there is no recognised laboratory in the country of export, testing in another country must be conducted in a laboratory recognised by the Veterinary Authority of the country of export.

# 18. Equine viral arteritis

For all horses excluding unweaned foals under six months of age:

For colts or stallions:

A single blood sample was taken from the horse at least four days after commencement of pre-export quarantine and tested using a virus neutralisation test for equine viral arteritis as described in the OIE Manual with negative results.

**OR**

The horse was subjected between six and nine months of age to a virus neutralisation test for equine viral arteritis as described in the OIE Manual with **either**

- a. a negative result, **or**
- b. with a positive result, carried out on two blood samples collected at least 14 days apart with a stable or decreasing titre

**and** was then vaccinated against equine viral arteritis within 24 hours of receiving the negative/second test result and regularly revaccinated.

**OR**

The horse was isolated and not earlier than seven days of commencing isolation was subjected to a virus neutralisation test for equine viral arteritis as described in the OIE Manual on a blood sample with negative results and was then vaccinated within 24 hours of receiving the negative test result and was kept separated from other equids for 21 days following vaccination and was regularly revaccinated.

**OR**

The horse was subjected to a virus neutralisation test for equine viral arteritis, as described in the OIE Manual, carried out on a single blood sample with positive results and then **either**

- a. was subsequently test mated to two mares within 180 days immediately before export which were subjected to two virus neutralisation tests for equine viral arteritis as described in the OIE Manual with negative results on blood samples collected at the time of test mating and again 28 days after the mating **or**
- b. was subjected to a virus isolation test for equine arteritis virus as described in the OIE Manual with negative results, carried out on semen collected during the 180 days immediately before export **or**
- c. was subjected to a virus isolation test for equine arteritis virus as described in the OIE Manual with negative results, carried out on semen collected within 180 days after the blood sample was tested, then vaccinated within 24 hours of receiving the negative test result and regularly revaccinated.

For fillies, mares and geldings:

The horse was subjected to a virus neutralisation test for equine viral arteritis, as described in the OIE Manual, carried out on blood samples collected either once within 21 days before export with a negative result, or on two occasions at least 14 days apart within 28 days before export, which demonstrated stable or declining antibody titres.

**OR**

The horse was regularly vaccinated.

**OR**

The horse was isolated for the 28 days immediately before export and during this period the isolated horses showed no signs of equine viral arteritis.

#### 19. Vesicular stomatitis

A blood sample was taken from the horse at least four days after commencement of pre-export quarantine and tested using an enzyme-linked immunosorbent assay or virus neutralisation test as described in the OIE Manual for vesicular stomatitis with negative results.

#### 20. For all horses including unweaned foals under six months of age:

- a. Within 24 hours after commencement of pre-export quarantine the horse was thoroughly examined for ticks under the direct supervision of an Official Veterinarian. A systematic approach was undertaken and the entire horse was examined, with particular attention to the ears, false nostrils, under-body areas (axilla, inguinal region and under the jawbone), perineum, mane and tail.

**AND**

- b. The horse was then treated within 24 hours, under the direct supervision of the Official Veterinarian, with a parasiticide effective against ticks (date and treatment schedule stated on the veterinary certificate).

**AND**

- c. If any horse in the pre-export quarantine facility was found to have ticks at commencement or during pre-export quarantine, the ticks were removed and all horses in the facility were treated within 24 hours and again seven days later with a parasiticide effective against ticks (date and treatment schedule stated on the veterinary certificate).

#### **5.2.4 Certification at port of export**

At the port of export, a government official must certify that:

1. During transport to the port of export, the horse had no contact with horses except those that meet all the conditions described in this import permit.
2. The compartment of the aircraft or vessel to be occupied by the horse and all removable equipment, penning and containers including loading ramps were satisfactorily cleaned and disinfected before loading.

#### **5.2.5 Transport**

1. Exporters or their agents must have detailed SOPs consistent with a risk-based approach and approved by DAFF, to cover procedures including contingency plans, for transporting the horse from pre-export quarantine until arrival in Australia.
2. The transport route from the pre-export quarantine facility to the approved airport must be approved by the Official Veterinarian.
3. The Official Veterinarian must be present during loading of horses when leaving the pre-export quarantine facility to ensure vehicles for transporting horses are adequately cleaned and disinfected before loading, to supervise sealing of vehicles for transporting horses with tamper-evident seals and to certify that the horses are fit to travel. A government officer authorised by the Veterinary Authority must be available at the airport to check the vehicle seals are intact on arrival and ensure ramps and air stalls are adequately cleaned and disinfected.
4. All personnel likely to be in direct contact with the horses during transport to Australia (including transport from the pre-export quarantine facility to the airport, at the airport, and on the aircraft) must shower and wear new or clean protective clothing and footwear before coming into contact with the horses. They must not have any contact with horses except those that meet all the conditions described in this import permit during transport to Australia.
5. All feed to be used during transport to Australia must enter the pre-export quarantine facility before commencement of pre-export quarantine.
6. The use of hay or straw as bedding during transport is not permitted. Treated wood shavings, sterilised peat and soft board can be used.
7. Horses must remain isolated from all animals except those that meet all the conditions described in this import permit during transport from the pre-export quarantine facility until arrival in Australia.

8. Insect netting must be carried on the flight at all times for contingencies. There must be sufficient insect netting to cover all air stalls completely. Insect netting must be in good condition to minimise entry of insect vectors into the air stalls.
9. An Australian government veterinarian may be required to accompany the shipment to Australia at the importer's expense.
10. The consignment may be accompanied by horses that do not meet all the conditions described in this import permit or animals of other species only with the prior written approval of DAFF. The consignment may not be accompanied by horses that do not meet all the conditions described in these biosecurity measures.
11. The design of the air stalls, the recommended requirements for horses, the preparation for transport, and the disinfection of the interior of the aircraft, removable equipment, penning and containers must be in accordance with the recommendations of the Code and International Air Transport Association Live Animal Regulations unless otherwise agreed by DAFF.

### **Transit and transshipment**

1. Horses must transit or transship only at an approved airport. Any transshipment requires the prior approval of DAFF. Stops en route to Australia will need approval and permits from relevant authorities in the countries of transit and transshipment. Transit and transshipment times must not exceed six hours. Horses are not to leave the airport and must not be removed from their air stalls during transit or transshipment.
2. Horses must remain on board the aircraft at approved transit airports. Unauthorised personnel must not have contact with the horses. Cargo doors can be opened at approved transit airports to allow for unloading or loading of freight. Immediately after the cargo hold doors are closed, an approved knockdown aerosol insecticide must be sprayed throughout the cargo hold, in the manner recommended by the manufacturer.
3. In cases where horses in air stalls are to be unloaded, before opening the cargo door, the air stalls must be completely covered in netting to prevent insect access to the horses. The netting must remain in place until the horses are reloaded on an aircraft. Immediately after the horses are reloaded on an aircraft and the cargo hold doors are closed, an approved knockdown aerosol insecticide spray must be sprayed throughout the cargo hold in the manner recommended by the manufacturer. The insect netting must not be removed until 30 minutes after spraying.

### **Delayed takeoffs and unscheduled landings**

1. Exporters or their agents must have contingency plans for the management of delayed takeoffs and unscheduled landings.
2. If unloading or any other transit/transshipment activities occur in a way that conflicts with these conditions, or if the aircraft makes an unscheduled landing, DAFF must be notified as soon as possible and before arrival in Australia. Additional biosecurity measures may be required, and DAFF will assess this on a

case-by-case basis after considering the risks.

### **Arrival in Australia**

1. Importers or their agents must have detailed SOPs consistent with a risk-based approach and approved by DAFF, to cover post-arrival procedures. These SOPs are to be developed in consultation with DAFF and must include roles and responsibilities for their staff, including grooms, cleaning and disinfection of air stalls, the area used to transfer horses to road transport at the airport, vehicles for transporting horses at the post-arrival quarantine facility, and road transport arrangements including contingency plans for vehicle and equipment failures.
2. After the horses arrive at an Australian airport they must be transferred from their air stalls onto vehicles for transporting horses, along with personnel and equipment, and proceed directly to the post-arrival quarantine facility. DAFF door seals must be applied to vehicles for transporting horses to maintain biosecurity integrity during transport to the post-arrival quarantine facility.
3. All personnel travelling with the horses on the aircraft and road transport, or that have had contact with the horses, biosecurity risk material or air stalls, must undertake appropriate decontamination measures as specified by DAFF before leaving the airport or the post-arrival quarantine facility if they are accompanying the horses to the post-arrival quarantine facility.
4. Feed and water used during transport can travel with the horses to the post-arrival quarantine facility for use only during post-arrival quarantine.
5. All biosecurity risk material (e.g. bedding, feed, water and waste material) remaining at the airport must be sealed in bags, ordered into quarantine and disposed of under DAFF supervision.
6. Air stalls must be secured at the airport in a manner that prevents release of biosecurity risk material and cleaned and disinfected in a manner approved by DAFF.
7. Vehicles for transporting horses from the port of entry to the post-arrival quarantine facility must be cleaned and disinfected to the satisfaction of the DAFF officer before loading the horses. DAFF must be advised of the transport route to the post-arrival quarantine facility.
8. Unless accompanying horses to the post-arrival quarantine facility, all equipment used during transport of the horses, and all baggage and personal equipment accompanying personnel, must be cleaned and disinfected under DAFF supervision before leaving the airport.

### **5.2.6 Post-arrival biosecurity measures**

#### **Post-arrival biosecurity measures for the importation of horses from Country X**

Any variation from the post-arrival biosecurity measures must be specifically authorised by DAFF.

1. For horses originating from a single pre-export quarantine facility:

The horse must be held in post-arrival quarantine for at least 14 days. During this time the horse must be isolated from equids except those that meet all the conditions described in this import permit **and**

nasopharyngeal samples (nasal samples for foals under six months of age) must be taken from the horse four to six days after commencement of post-arrival quarantine and within four days of release from post-arrival quarantine and tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene with negative results in each case.

OR

For horses originating from multiple pre-export quarantine facilities:

The horse must be held in post-arrival quarantine for at least 14 days. During this time the horse must be isolated from equids except those that meet all the conditions described in this import permit **and**

the period of intake of consignments into the post-arrival quarantine facility should be kept to a minimum. The post-arrival quarantine period will commence from the time of entry into the facility of the last horse of the post-arrival quarantine intake **and**

nasopharyngeal samples (nasal samples for foals under six months of age) must be taken from horses within 24 hours of arrival into the post-arrival quarantine facility and four to six days after commencement of post-arrival quarantine and within four days of release from post-arrival quarantine and tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene with negative results in each case.

NOTE: A single consignment may be split between post-arrival quarantine facilities on arrival in Australia. In cases where consignments are split the status of one portion of the consignment may affect the status of the other portion. If the release of one portion is delayed for biosecurity reasons the release of the other portion may be delayed also.

2. A reference serum sample must be taken from the horse within 24 hours of arrival into the post-arrival quarantine facility and stored at the National Animal Serum Bank at the Australian Animal Health Laboratory.
3. For the duration of post-arrival quarantine the rectal temperature of the horse must be taken and recorded twice daily at least eight hours apart. If the temperature is 38.5 °C (39 °C or higher for a foal under six months of age) or higher on two consecutive recordings or other signs of respiratory disease are present, a nasopharyngeal sample (nasal sample for foals under six months of age) must be taken and tested using a validated type A influenza pan-reactive real time polymerase chain reaction assay targeting the matrix gene and DAFF notified on the same day. If the temperature cannot be taken for any reason on two consecutive occasions, DAFF must be notified on the same day and a clinical examination by a registered veterinarian performed. Temperature records must be made available for inspection by DAFF.
4. Within 24 hours of arrival at the post-arrival quarantine facility the horse must be thoroughly examined for ticks by a registered veterinarian under the direct

supervision of the DAFF veterinarian. A systematic approach must be undertaken with close examination of ears, false nostrils, under-body areas (axilla, inguinal region and under the jawbone), perineum, mane and tail.

**AND**

If any horse in the post-arrival quarantine facility is found to have ticks, the ticks must be removed and all horses in the facility must be treated within 24 hours, under the direct supervision of the DAFF veterinarian, with a parasiticide effective against ticks. The horse with ticks must be tested for both *Babesia caballi* and *Theileria equi* using a blood sample obtained at least 11 days after treatment for ticks.

5. If any horse does not meet the conditions on this import permit, or exotic disease is diagnosed, that horse, and any or all horses in the post-arrival quarantine facility may be:
  - detained in quarantine for further testing and observation;
  - exported at the importer's expense;
  - destroyed without recompense.
6. During post-arrival quarantine and/or while the imported horses remain under quarantine surveillance, they may be subjected to any testing or treatments prescribed by the DAFF to address any animal health concerns, at the importer's expense.
7. The importer will be charged for services provided by the Australian Government. If any animals die or are destroyed during any period of control, compensation will not be paid by the Australian Government.

**Location**

1. The post-arrival quarantine facility should be close to the port of arrival and be conveniently located for supervision by the DAFF veterinarian.
2. The facility must be located in an area that has been free from equine infectious anaemia during the previous 12 months.
3. The facility must not be located in an area supporting high populations of horses.

**Facilities**

1. The post-arrival quarantine facility must be surrounded by two secure stock-proof fences at least five metres apart, or a physical barrier providing equivalent security to prevent horses in post-arrival quarantine having contact with people or animals outside the facility.
2. The post-arrival quarantine facility including stables, yards, fences, feeding and watering arrangements must address animal welfare considerations.
3. Stables in the post-arrival quarantine facility must be constructed so that they can

be cleaned and disinfected.

4. The post-arrival quarantine facility must provide a separation of at least 100 metres from other equids except those that meet all the conditions described in this import permit.
5. The post-arrival quarantine facility must have a separate area for the cleaning and disinfection of vehicles for transporting horses, and facilities for the safe unloading and loading of horses.
6. The post-arrival quarantine facility must have facilities for veterinary examination and the collection of samples.

## **Operation**

1. The post-arrival quarantine facility must be approved by DAFF before entry of any horse into the facility.
2. DAFF may audit the approved post-arrival quarantine facility.
3. All post-arrival quarantine operations and procedures must have detailed SOPs, consistent with a risk-based approach and approved by DAFF.
4. The process from the time horses arrive at the airport to the completion of post-arrival quarantine must be auditable.
5. Post-arrival quarantine must be under the supervision of the DAFF veterinarian.
6. The DAFF veterinarian must inspect the post-arrival quarantine facility before entry of any horse and must ensure that the facility has been cleaned and disinfectant applied to his/her satisfaction.
7. The post-arrival quarantine period will commence from the time of entry into the facility of the last horse of the post-arrival quarantine intake.
8. During post-arrival quarantine, the only horses in the facility must be those of the import consignment.
9. For the duration of post-arrival quarantine the horse must not be held, housed or exercised within 100 metres of other equids except those that meet all the conditions described in this import permit.
10. Horses must not have the opportunity to mate while in post-arrival quarantine.
11. Appropriate biosecurity procedures must be implemented for vehicles for transporting horses, freight containers, equipment and associated personnel, including transport operators, before, during and after the transport of horses to the post-arrival quarantine facility.
12. Vehicles for transporting horses are not permitted to leave the post-arrival quarantine facility until thoroughly cleaned and disinfected to the satisfaction of the DAFF officer.

13. Each imported horse must be identified on arrival at the post-arrival quarantine facility and the accompanying veterinary certificate and passport examined and checked by DAFF.
14. Only personnel specifically authorised by DAFF are permitted to enter the post-arrival quarantine facility. Details of all visitor entries must be recorded.
15. All personnel entering the post-arrival quarantine facility during post-arrival quarantine must wear dedicated or disposable outer clothing and dedicated, cleaned and disinfected or disposable footwear. All personnel must shower and change outer clothing before leaving the post-arrival quarantine facility. Outer clothing and footwear used within the post-arrival quarantine facility must be cleaned to the satisfaction of DAFF before removal from the facility.
16. All equipment used in feeding, handling and treating horses in post-arrival quarantine must either be cleaned and disinfected to the satisfaction of DAFF before removal from the post-arrival quarantine facility, or remain on-site for the duration of post-arrival quarantine and then be released with DAFF approval at the completion of post-arrival quarantine.
17. Other than inspections, visits and treatments required for certification, all veterinary visits, health problems, tests, test results and treatments must be reported to the DAFF veterinarian within 24 hours.
18. Any health problems affecting other animals on the facility undergoing post-arrival quarantine must be reported to the DAFF veterinarian within 24 hours.
19. A detailed health record must be kept for each horse on the facility during the post-arrival quarantine period and it must be available to the DAFF veterinarian.
20. The DAFF veterinarian must document that veterinary certificates and health records have been inspected and comply with the biosecurity measures.
21. Horses must not leave the facility during post-arrival quarantine.

# **Additional certification for horses that have resided in an approved country (or countries) other than the exporting country during the 60 days before export to Australia**

To be completed by the Official Veterinarian of each country that the horse resided in before the country of export.

I, ..... (insert name), the Official Veterinarian\* of ..... (name of approved country), hereby certify that:

\*Official Veterinarian means a veterinarian authorised by the Veterinary Authority of the approved country to perform certain official tasks associated with animal health and/or public health, and inspections of commodities and, when appropriate, to certify in conformity with the provisions of Chapters 5.1. and 5.2. of the World Organisation for Animal Health (OIE) Terrestrial Animal Health Code.

1. The horse was continuously resident from ..... to ..... (dates) in .....(name of approved country).
2. During the 60 days immediately before export to Australia while in ..... (name of approved country):
  - a. The horse was continuously resident and free of quarantine restriction in ..... (approved country) where no clinical, epidemiological or other evidence of glanders occurred during the previous three years and the disease is compulsorily notifiable.
  - b. The horse was continuously resident and free of quarantine restriction in ..... (approved country) where no clinical, epidemiological or other evidence of African horse sickness, dourine, Venezuelan equine encephalomyelitis or vesicular stomatitis occurred during the previous two years and the diseases are compulsorily notifiable. While in ..... (approved country), the horse was not vaccinated against African horse sickness or Venezuelan equine encephalomyelitis during the 60 days before export to Australia.
  - c. The horse was continuously resident and free of quarantine restriction in ..... (approved country) where no clinical, epidemiological or other evidence of Eastern or Western equine encephalomyelitis occurred during the previous two years.

OR

The horse did not reside on any premises in ..... (approved country) where clinical, epidemiological or other evidence of Eastern or Western equine encephalomyelitis occurred during the previous 90 days.

OR

During the 12 months before export, but not during pre-export quarantine, the horse was vaccinated against Eastern and Western equine encephalomyelitis using an approved vaccine according to the manufacturer's recommendations.

- d. The horse was continuously resident and free of quarantine restriction in ..... (approved country) where no clinical, epidemiological

or other evidence of Japanese encephalitis, screw-worm-fly (*Cochliomyia hominivorax* or *Chrysomya bezziana*) myiasis or surra occurred during the previous 12 months.

- e. After due inquiry, the horse did not reside on any premises in ..... (approved country) where clinical, epidemiological or other evidence of rabies occurred in any species during the previous 12 months and the disease is compulsorily notifiable.
- f. After due inquiry, the horse did not reside on any premises in ..... (approved country) where clinical evidence of Borna disease occurred during the previous 90 days.
- g. After due inquiry, the horse did not reside on any premises in ..... (approved country) where clinical, epidemiological or other evidence of contagious equine metritis, epizootic lymphangitis, equine infectious anaemia, equine piroplasmosis or Lyme disease occurred during the previous 60 days.
- h. After due inquiry, the horse did not reside on any premises in ..... (approved country) where clinical, epidemiological or other evidence of anthrax, equid herpesvirus-1 (abortigenic and neurological strains), equine influenza or equine viral arteritis occurred during the previous 30 days.
- i. For all horses (excluding donkeys and mules) excluding geldings and unweaned foals under six months of age:

After due inquiry, the horse was never mated to, or inseminated with semen from, a horse that was, at the time of mating or semen collection, known to be infected with *Taylorella equigenitalis*.

Note: If a horse does not meet this requirement, or has been known to be infected with *T. equigenitalis*, it may be permitted entry subject to an approved method of treatment and testing considered appropriate by the Director of Quarantine (or delegate).

- j. After due inquiry, while in ..... (approved country), the horse was not treated with imidocarb or other anti-babesial agents active against *Babesia caballi* or *Theileria equi*, during the 12 months before commencement of pre-export quarantine.
- k. After due inquiry, while in ..... (approved country), the horse was not positive in any test for equine piroplasmosis (*B. caballi* or *T. equi*) for at least 12 months before the commencement of pre-export quarantine.

Official Veterinarian

Name: .....

Official position: .....

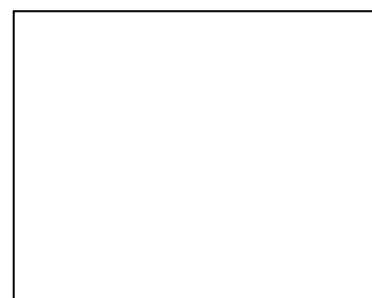
Address: .....

.....

Signature: .....

Date: .....

Official stamp



### African horse sickness

African horse sickness (AHS) is caused by a virus of the Orbivirus genus of the family Reoviridae (Mertens et al. 2005). AHS virus affects dogs, donkeys, horses, mules and zebras (Coetzee and Guthrie 2004; Mellor and Hamblin 2004).

AHS is endemic to sub-Saharan Africa and probably Yemen (Calisher and Mertens 1998; Mellor and Boorman 1995; Sailleau et al. 2000). There have been outbreaks in northern Africa, the Iberian Peninsula, the Indian subcontinent and the Middle East (MacLachlan and Guthrie 2010). AHS has never been reported in Australia.

Since the *Import risk analysis report for horses from approved countries: final report*. (horse IRA), there has been an increase in the number of serotypes of AHS virus present within the northern limits of the virus' range in sub-Saharan Africa (MacLachlan and Guthrie 2010). Experience with bluetongue virus, a vector borne orbivirus of ruminants, indicates that once these viruses reach North Africa they readily can spread into Europe (Purse et al. 2008).

AHS virus is transmitted by biting arthropods, including midges, mosquitoes and ticks. Species of the genus *Culicoides* are the principal vectors (Mellor and Hamblin 2004). In Australia, several species of culicoides are vectors for bluetongue virus, and are potential vectors for AHS virus.

Australia's current biosecurity measures are in accordance with the Code recommendations and include certification of country freedom (OIE 2012a).

The current biosecurity measures were considered appropriate risk management for African horse sickness.

### Dourine

Dourine is a sexually transmitted disease of donkeys and horses, caused by the protozoan *Trypanosoma equiperdum*.

The disease occurs in most of Asia, northern and southern Africa, parts of the Middle East, Russia, South America, and south-eastern Europe (Hoare 1972; Soulsby 1982). It has been eradicated from Canada and the United States. Dourine has never occurred in Australia (Geering et al. 1995).

Since the horse IRA, several cases of dourine in horses were detected in Italy in 2011 (Promed Mail 2011a; Promed Mail 2011b).

*T. equiperdum* is transmitted venereally at mating. Foals can be infected by genital tract discharges from infected mares or from milk contaminated with discharges from lesions on the udder (Hoare 1972). Transmission by needles and arthropod vectors can occur but due to the transient and low grade parasitaemia, transmission by these methods is unlikely.

Australia's current biosecurity measures are in accordance with the Code recommendations and include certification of country freedom (OIE 2012b).

The current biosecurity measures were considered appropriate risk management for dourine.

## Glanders

Glanders is a highly contagious zoonotic bacterial disease caused by *Burkholderia mallei*, which mainly affects equids (Dvorak and Spickler 2008). Once prevalent virtually worldwide, glanders has been eradicated from many countries, including Canada, Western Europe and the United States (Dvorak and Spickler 2008). However, the disease persists in some African, Asian and South American countries (OIE 2010).

Since the horse IRA, several cases of glanders in horses were detected in Bahrain (Promed Mail 2010; Promed Mail 2011c) and Lebanon (Promed Mail 2011d) in 2010–11. Glanders, previously recognised in Brazil, has been reported for the first time in the State of Bahia in 2012 (OIE 2012e).

Transmission occurs directly or indirectly through contact with skin exudates and respiratory secretions, which may contain large numbers of organisms (CFSPH 2007) or in carnivores via consumption of infected meat (Miller et al. 1948). Transmission in equids most commonly occurs through ingestion of the organism, respiratory exposure or by entry through skin abrasions or mucous membranes (Dvorak and Spickler 2008).

Australia's current biosecurity measures are in accordance with the Code recommendations and include certification of country freedom (OIE 2012c).

The current biosecurity measures were considered appropriate risk management for glanders.

## West Nile fever

A new variant strain, WNV<sub>NSW2011</sub>, of West Nile virus was responsible for an outbreak of encephalitis in horses in Australia in 2011 (Frost et al. 2012).

The Code states that trade restrictions for West Nile fever should not be imposed for dead-end hosts such as horses (OIE 2012d).

Horses do not develop viraemia of a titre or duration that would enable vector borne transmission. Vaccination for West Nile fever is no longer a requirement.

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### Guidelines for assessment of pre-export quarantine facilities for horses

The following guidelines are used by the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) when determining whether a prospective pre-export quarantine facility can achieve the biosecurity standards necessary to be approved to hold horses, donkeys and mules intended for export to Australia. 'Horse' refers to horses, donkeys and mules unless otherwise specified.

Any variation from these must be specifically authorised by DAFF. DAFF will consider applications for variation on the basis of equivalent measures that achieve the same level of biosecurity assurance.

Pre-export quarantine facilities will only be granted approval after DAFF is satisfied that they have all necessary structural and procedural measures in place to achieve full compliance with relevant biosecurity objectives. Initially, this will require documentation and on-site assessments by DAFF, in consultation with the local Veterinary Authority. Veterinary Authority systems approval may be considered after a history of compliance with Australia's import conditions has been established.

#### Location and transportation

1. The pre-export quarantine facility must be conveniently located for supervision by the Official Veterinarian.
2. The pre-export quarantine facility must be located so as to enable biosecurity, segregation and animal welfare standards to be maintained during the transportation of horses from the facility to the port of export.

NOTE: A transportation plan must be provided to DAFF to demonstrate how this requirement will be complied with.

#### Facilities

1. The pre-export quarantine facility must meet the country and premises requirements specified in the **certification before export** section of the Australian import conditions relevant to the country of export.
2. The entire pre-export quarantine facility must be surrounded by two secure stock-proof fences at least five metres apart, or a physical barrier providing equivalent security to prevent horses in pre-export quarantine having contact with people or animals outside the facility.
3. The pre-export quarantine facility including stables, yards, fences, feeding and watering arrangements must address animal welfare considerations.
4. Stables in the pre-export quarantine facility must be constructed so that they can be effectively cleaned and must be maintained in good order.

5. The pre-export quarantine facility must provide a separation of at least 50 metres from other equids not of the same consignment or have additional risk mitigation measures that provide an equivalent level of biosecurity protection.
6. The pre-export quarantine facility must have a separate area for the cleaning and disinfection of vehicles for transporting horses, and facilities for the safe unloading and loading of horses.
7. The pre-export quarantine facility must have facilities for veterinary examination and collection of samples.

## **Operation**

All pre-export quarantine operations and procedures must be detailed in standard operating procedures (SOPs), and be consistent with a risk-based approach and approved by DAFF. DAFF may audit the approved pre-export quarantine facility.

For a prospective pre-export quarantine facility to be approved, in addition to meeting the requirements specified in the import conditions, the facility's SOPs must include details of how all of the following requirements will be met:

1. All feed to be used during pre-export quarantine and transport to Australia must enter the pre-export quarantine facility before commencement of pre-export quarantine.
2. All bedding to be used during pre-export quarantine must enter the facility before commencement of pre-export quarantine.
3. All equipment used in feeding, handling and treating horses in pre-export quarantine must be new, or cleaned and disinfected before entry, and must be used only in the facility during pre-export quarantine.
4. During pre-export quarantine, the facility must be occupied only by horses prepared in accordance with the import permit conditions. If non-travelling companion horses are present they must be vaccinated, tested and treated as if they were intended to be exported to Australia.
5. Horses in pre-export quarantine must not be held, housed or exercised within 50 metres of other equids not of the same consignment, or additional risk mitigation measures approved by DAFF that provide an equivalent level of biosecurity protection must be implemented.
6. Horses in pre-export quarantine must only access areas used by other horses (e.g. shared exercise areas) with prior written approval from DAFF.
7. Horses must not have the opportunity to mate and must not be subjected to reproductive manipulation, other than required for certification, while in pre-export quarantine.
8. Only personnel specifically authorised by the Official Veterinarian are permitted entry to the pre-export quarantine facility. Details of all visitor entries must be recorded.

9. All personnel entering the pre-export quarantine facility during pre-export quarantine must shower and change clothing on entry. Alternatively, they may shower off-site and must have no contact with horses or horse facilities/equipment between showering and entering the pre-export quarantine facility. Outer clothing used in the pre-export quarantine facility must be freshly laundered or dedicated to the facility and stored on site or disposable. Footwear used in the pre-export quarantine facility must be cleaned and disinfected before entry or dedicated to the facility and stored on site, or disposable covering may be used over existing footwear.
10. Other than inspections, visits and treatments required for certification, all veterinary visits, health problems, tests, test results, treatments and reasons for removal from pre-export quarantine of any horse, must be reported to the Official Veterinarian within 24 hours, and to DAFF within 48 hours.
11. A detailed health record must be kept for each horse and be available to the Official Veterinarian and to DAFF on request.
12. For the duration of pre-export quarantine the rectal temperature of the horse, including unweaned foals under six months of age, must be taken and recorded twice daily at least eight hours apart. If the temperature is 38.5 °C or higher (39 °C or higher for a foal under six months of age) on two consecutive recordings or other signs of infectious respiratory disease are present, a nasopharyngeal sample must be taken and tested for influenza A virus and DAFF must be notified within 48 hours. If the temperature is not taken for any reason on two consecutive occasions, DAFF must be notified within 48 hours and a clinical examination by a registered veterinarian performed. Temperature records must be kept until completion of post-arrival quarantine.
13. The health status of horses that do not complete pre-export quarantine or that do not travel to Australia with the rest of the consignment may affect the eligibility of the rest of the consignment to be imported into Australia. DAFF must be notified within 48 hours and before uplift of any changes to the proposed consignment.